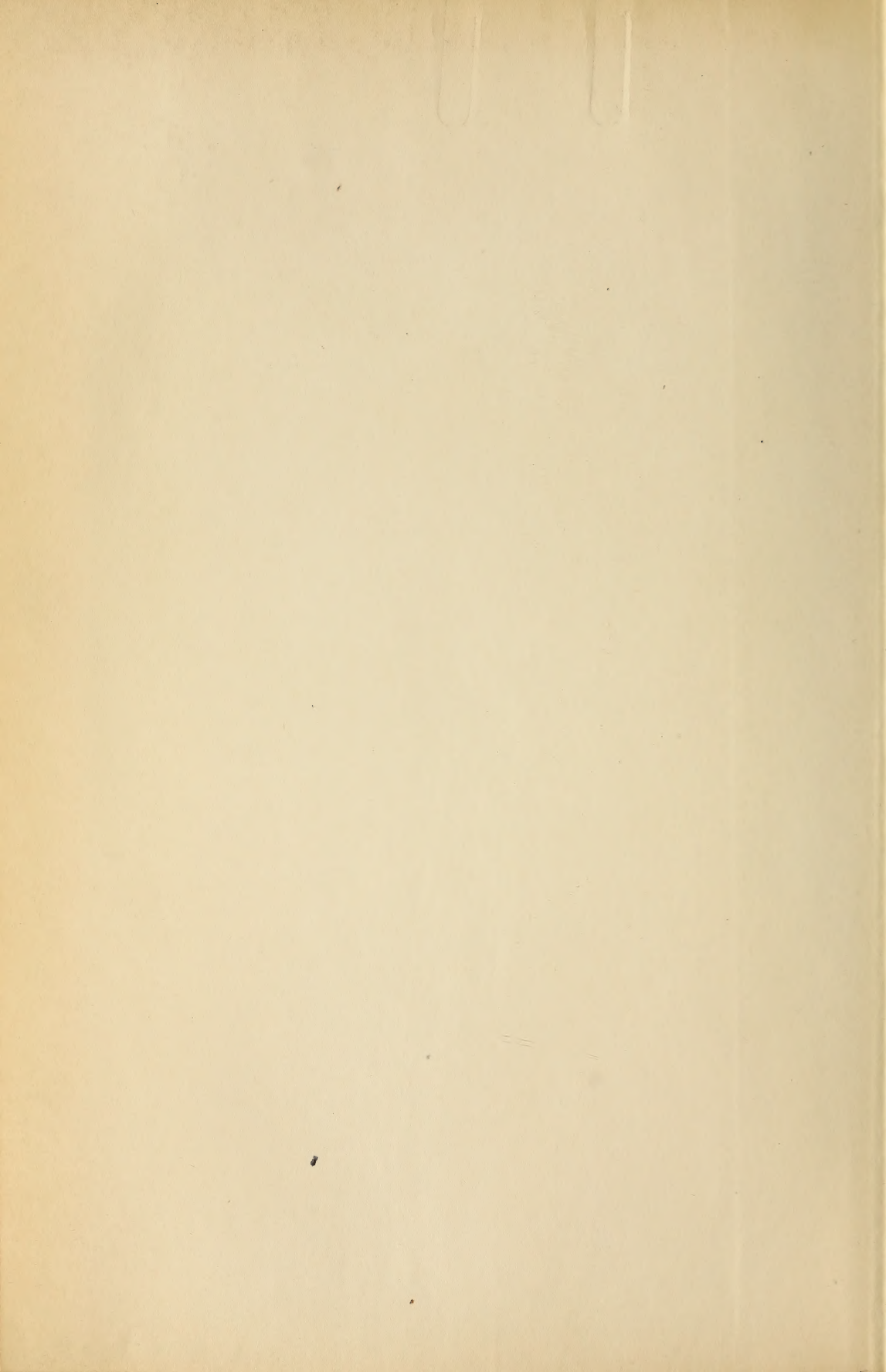
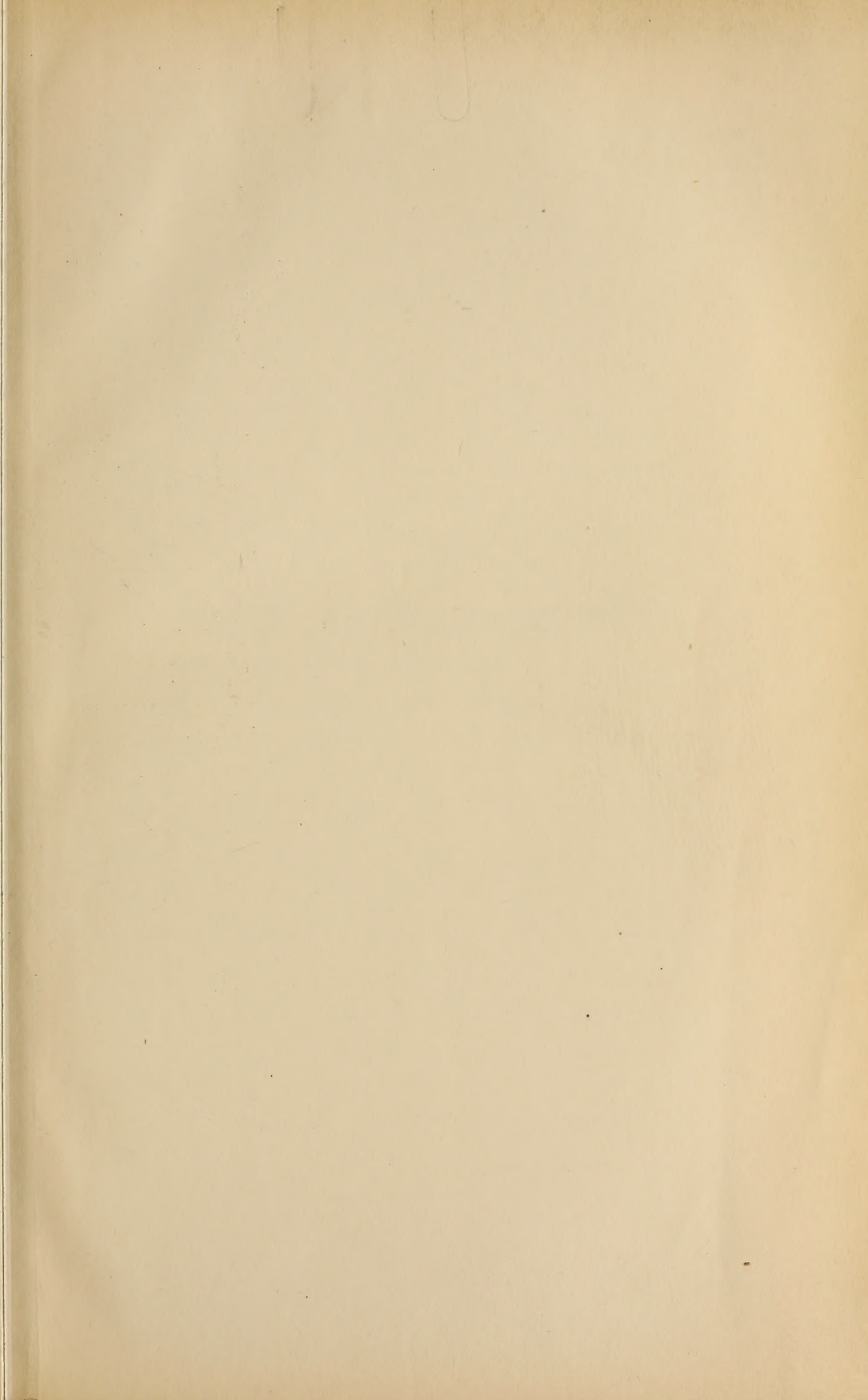
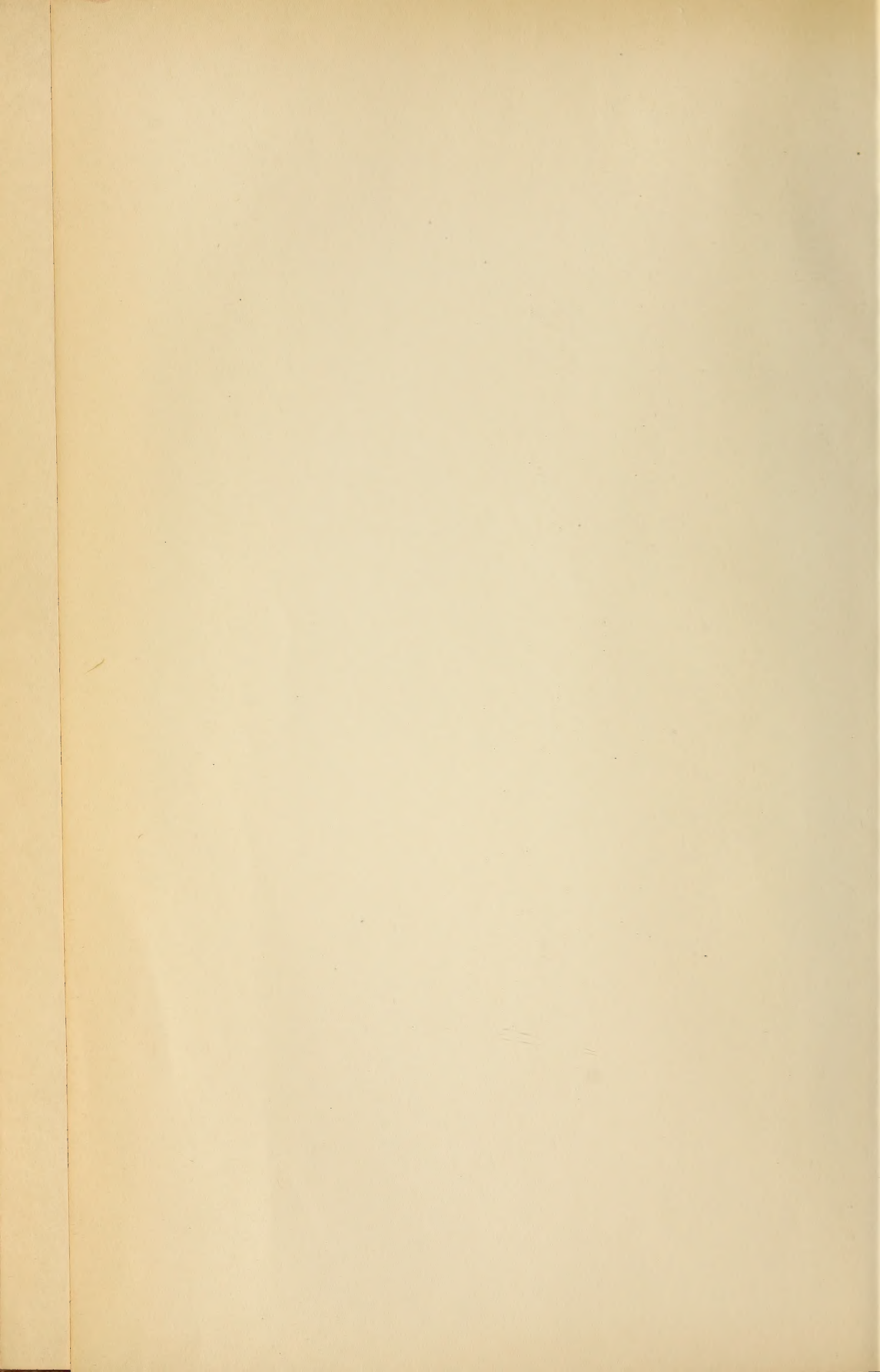












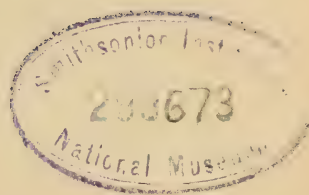
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VOLUME XXIX

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VOLUME XXIX



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1. *Additional Trypetid Material in the Collection of the South African Museum (Trypetidae, Diptera).* By H. K. MUNRO, B.Sc., F.E.S. (With Plate I.)
2. *Contributions to a Knowledge of the Fauna of South West Africa. VIII. Records and Descriptions of Acrididae from South West Africa (Orthoptera Saltatoria).* By B. P. UVAROV, Imperial Bureau of Entomology. (With Plate II and 12 Text-figures.)
3. *A Revision of the South African Gryllacridae (Orthoptera Saltatoria).* By H. H. KARNY (Buitenzorg, Dutch East Indies). (With 25 Text-figures.)
4. *New South African Solifugae.* By R. F. LAWRENCE, B.A., Ph.D., Assistant in Charge of Arachnida. (With 18 Text-figures.)
5. *Contributions to the Crustacean Fauna of South Africa. No. 10. Revision of Branchiopoda.* By K. H. BARNARD, M.A., D.Sc. F.L.S., Assistant Director. (With 33 Text-figures.)
6. *Appendix to Speleiacris tabulae, Pér. Additional Notes.* By A. J. HESSE, Ph.D., F.E.S.



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1. *Additional Trypetid Material in the Collection of the South African Museum (Trypetidae, Diptera).*—By H. K. MUNRO, B.Sc., F.E.S.

(With Plate I.)

THROUGH the kindness of Dr. L. Gill, Director of the South African Museum, and of Dr. A. J. Hesse, the Assistant in Charge of Entomology, I have been able to examine all the Trypetid material in the Museum collection. In addition to the material determined by the late Professor M. Bezzi, including some of his types, and published in vol. xix of the Museum Annals in 1924, there are numerous specimens collected subsequently, as well as a certain amount of older material apparently not seen by Professor Bezzi.

The new material was obtained mainly from two localities, the Tradouw Pass in the Swellendam district and the northern part of South-West Africa, by expeditions undertaken by the South African Museum.

It is, perhaps, remarkable that relatively few Trypetidae have been recorded from the south-western districts of the Cape Province. The material collected in the Tradouw Pass is therefore of much interest, although only sixteen species, all belonging to the Trypetinae, are represented.

The greater part of the material, representing forty species, was collected in the northern part of South-West Africa towards the Angola border, in what is known as the Kaokoveld. Practically no Trypetidae have previously been recorded from this area, an area in which the family is evidently well represented. The preponderance

of flower-infesting species (Rhabdochaetinae, Schistopterinae, Trypetinae, and some of the Ceratitinae) over the fruit-infesting species (*Ceratitis*, s. l.) and the cucurb and milkweed infesting Dacinae is noticeable. This is, without doubt, merely a reflection of the composition of the flora of the region.

In spite, however, of the preponderance of the flower-infesting species, a fact usually associated with more temperate regions, the Trypetid fauna of the Kaokoveld is more closely associated with that of Central Africa, more especially with that of Rhodesia, and perhaps the northern and eastern Transvaal, than with the fauna of South Africa proper. At the same time it should be remembered that the country is vast, and that collecting has been done in more or less isolated localities. There is thus scarcely sufficient data on which to make more than very generalised statements as to the distribution and relationships of the Trypetid fauna. That caution must be exercised is shown by the discovery of the European *Trypanea amoena* (Fr.), the curious East African species *Bactropota woodi* Bez., and more especially of the remarkable Egyptian species *Schistopterum moebiusi* Beck., the last a discovery of much importance.

DACINAE.

Tridacus pectoralis (Walker, 1861).

The specimens in the collection are all typical *pectoralis* (Walk.) as recognised by Bezzi. As stated by him in the Annals of the South African Museum (vol. xix, p. 455), *pectoralis* (Walk.) is little more than a form or variation of Bigot's *bivittatus*, if indeed it is not merely a synonym. In specimens of *pectoralis* the infuscation of the lower half of the first posterior cell is often much paler than the broad costal band.

There are a few specimens from M'fongosi, Zululand, April-May 1916, March-May 1917, and January 1923, W. E. Jones, as well as a few specimens from Port St. John's, 1902, Shortridge; Livingstone, 1911, Miss Powell; Kloof, Natal, 8.2.15, Marley; and Mt. Selenda, Melsetter, Rhodesia, 13.3.14. The last-mentioned specimen had been determined as *bivittatus* Big. through the Imperial Bureau of Entomology.

Dacus fuscatus Wiedemann, 1819.

A couple of specimens from M'fongosi, Zululand, February-March, 1917, W. E. Jones; and from Howick, Natal, J. Cregoe; and one from

Hex River, 7th January 1884. The last specimen is labelled *Dacus rufipes* Bigot, probably an unpublished manuscript name.

Dacus brevistriga Walker, 1861.

There are a couple of specimens from M'fongosi, Zululand, December 1911, W. E. Jones ; one from Kloof, Natal, 8.2.15, Marley ; and a few from Dunbrody, Cape (no date).

Dacus brevistylus Bezzi, 1908.

In addition to the material already recorded by Bezzi in 1924 (Ann. S.A. Mus., vol. xix, p. 462) there are sundry odd specimens as follows : Walvis Bay, 1888, Wilmer ; Durban, 1891, Hunt ; Seymour, C.P., February 1891 ; Estcourt, Natal, 1894, E. Haviland ; Smithfield, O.F.S., 1908-1910, Kannemeyer ; van Wyk's Vlei, C.P., April 1910 ; Inhaca, Lourenço Marques, October 1912, K. H. Barnard ; East London, July 1914, E. Lightfoot ; Potchefstroom, T. Ayres ; Salisbury, Southern Rhodesia, D. Dodds ; numerous specimens were also collected by the Museum Expedition in South-West Africa from January to March 1925 at Zesfontein, Otjikondo, Kaoko Otavi, and Zandfontein.

Dacus vertebratus Bezzi, 1908.

In addition to the material already recorded by Bezzi in 1924 (Ann. S.A. Mus., vol. xix, p. 462) there are odd specimens from van Wyk's Vlei, 30.4.86, S. G. Alton ; Vryburg, June 1914 ; M'fongosi, Zululand, February 1915, W. E. Jones ; Gaub, S.W.A., December 1919, R. W. E. Tucker ; Howick, Natal ; and several specimens collected by the Museum Expedition to South-West Africa in January to March 1925 at Zesfontein and Otjikondo.

Dacus binotatus Loew, 1862.

Of this species there are a few specimens : Bathurst, Cape, 1898, "on wings" ; Howick, Natal, J. Cregoe ; M'fongosi, Zululand, May 1917 and February 1923, W. E. Jones ; and Zesfontein, S.W.A., February 1925, Mus. Exp.

Dacus immaculatus Coquillett, 1901.

There is a specimen from Howick, Natal, J. Cregoe, and one from Willowmore, Cape, 6.1.17.

Dacus oleae Gmelin, 1788.

There are two specimens of this species from the collection of the Cape Entomologist, Department of Agriculture, Cape Town.

Dacus rufus Bezzi, 1915.

Of this species there is a single faded specimen from Cape Town, April 1916, L. Péringuey, not previously recorded.

CERATITINAE.

Pterandrus rosa (Karsch, 1887).

A couple of females from M'fongosi, Zululand, February 1917, W. E. Jones, and another specimen from Port Shepstone, January 1915, Marley.

Pardalaspis melanaspis Bezzi, 1920.

A single female specimen from Zesfontein, S.W.A., February 1925, Mus. Exp.

Pardalaspis cosyra (Walker, 1849).

Three specimens labelled "Bred from wild plum, *Spondias* sp., Victoria Falls."

Pardalaspis giffardi Bezzi, 1912.

Of this species there are a few specimens from Umtali, Rhodesia, 6.9.15, with the number 749. They were probably received from the Department of Agriculture, Salisbury, Rhodesia.

Pardalaspis quinarina Bezzi, 1918.

Of this Rhodesian species there is a single female from Zesfontein, S.W.A., February 1925, Mus. Exp.

Pardalaspis aliena Bezzi, 1920.

There is a single damaged female labelled "S.W. Distr., Cape Colony."

RHACOCOLAENA Loew, 1862.

In the original description of this genus the chaetotaxy is not detailed, but in his table on page 76 of vol. xv of the Bulletin of Ento-

mological Research (1924) Bezzi states "no prst. and no oc." With regard to the ocellar bristles, however, I have to record that in all the species examined by me, namely, *pulchella* Bez., *fasciolata* Lw., *major* Bez., and *permagna* n. sp., these bristles are present. They are minute and of hair-like proportions, but, nevertheless, from their well-defined and constant position in each species, they are undoubtedly the ocellar bristles.

Rhacoclaena permagna n. sp.

(Plate I, fig. 1, wing.)

A large robust species allied to *major* Bez., from which it differs chiefly in the wing pattern.

♂. Length of body, 7.5 mm.; of wing, 6.2 mm. Occiput yellowish, with restricted, black, shining patches touching upper corners of eyes; eyes rounded—from a relaxed specimen they appear to be, in life, shining green with two broad, longitudinal, transverse bands of a dull reddish colour, the one above, the other below the line of the base of the antennae; frons yellow, blackish across the middle with a few short black hairs; ocellar dot black; face concave, whitish yellow, broadly infuscated with brown along the mouth border; antennae as long as the face, dark yellow; arista rather long plumose; palpi and proboscis yellow; bristles black; three inferior orbitals; ocellars very small but distinct.

Thorax and scutellum dark brownish; on dorsum with blackish sub-median and sub-lateral stripes and a median white stripe on posterior two-thirds and across scutellum—the stripe is pointed anteriorly, widening to the scutellum; some rather sparse whitish dust on anterior part of thorax; on either side is a strong, shining white notopleural stripe from whitish humerus to black mesophragma; bristles black; two mesopleurals; dorso-centrals behind line of anterior supra-alars. Scutellum with four bristles.

Legs dark yellow with black bristles and black pubescence. Halteres yellow. Wings with upper cross-vein slightly before middle of discoidal cell, and three times its length from the lower cross-vein; stigma brown; no basal streak; a well-defined brown band from outer half of stigma, across upper cross-vein, slantingly across discoidal cell and into third posterior cell, where it becomes lighter and more diffused, but is very faintly connected along hind margin of wing with terminal band; terminal band broad, covering end of marginal cell, outer half of sub-marginal, almost outer two-thirds of first

posterior, end of discoidal, whole of second posterior, and apex of third posterior cells; at the tip of the marginal cell is a tiny whitish dot; at the end of the first posterior cell is the characteristic apical whitish spot, and in the second posterior cell a broad, rounded indentation; between the two bands described is a short, narrow band from the costa crossing the marginal and submarginal cells. The anal cell is drawn out into a sharp point; the third vein is bristly along its whole length.

Abdomen shining black with a broad yellow median stripe except on last segment; pubescence blackish; there is a terminal fringe of black bristles on last segment; genitalia black with elongate yellow appendages.

♀. Total length, 9.6 mm.; of wing, 6.3 mm.; of ovipositor, 2.6 mm. The median yellow stripe on the abdomen does not extend on to the last two segments; ovipositor elongate, flask-shaped, black, two-thirds length of abdomen; pubescence black.

Types ♂ and ♀ and an additional ♂ from M'fongosi, Zululand, W. E. Jones (no date).

Afrocneros mundus (Loew, 1863).

One specimen from Willowvale, C.P., 6.11.17.

Coelotrypes vittatus Bezzi, 1924.

The undescribed male is similar to the female.

There are several specimens from Zesfontein and Kamanyab, S.W.A., February 1925, Mus. Exp., and a male from Nyaka, P.E.A., R. F. Lawrence.

The species is also recorded from the Congo and from Madagascar.

TERELLIA Robineau-Desvoidy, 1830.

This is a genus that requires revision and comparison with European forms; as interpreted here it seems well represented in the Ethiopian Region. The inclusion, however, of species with banded (*Sitarea* R.D.) and species with unbanded wings does not seem satisfactory unless supported by anatomical characters. The generic relationships, too, merit attention; one species in particular, *Terellia australis* Bez. (described as a variety of *Terellia planiscutellata* Beck.) seems to be more related to *Acanthiophilus helianthoides* Bez. than to *Terellia taeniaptera* Bez.

The Ethiopian species may be distinguished as follows:—

1. (6) Wings with dark bands.
2. (3) Wings with two forked dark bands and without isolated spots; antennae and legs blackish; bristles of head and thorax black. *hysia* Walk.
3. (2) Wings with unforked bands and isolated spots.
4. (5) Antennae and legs entirely pale yellowish. *taeniaptera* Bez.
5. (4) Antennae dark brown and all femora mainly black *nigrofemorata* n. sp.
6. (1) Wings quite hyaline or more or less distinctly, though faintly, spotted.
7. (10) Wings with faint, but generally distinct, spots towards apex (very seldom quite absent).
8. (9) Larger species (3.5-4 mm.), with milky wings and more pronounced and definite spotting towards apex. *australis* Bez.
9. (8) Smaller species (2.5 mm.), with less milky wings and more restricted spotting towards apex; eyes large and rounded; frontal bristles yellow. *xanthochaeta*, n. sp.
10. (7) Wings quite unspotted; head much shortened. *complanata*, n. sp.

Terellia nigrofemorata, n. sp.

(Plate I, fig. 2, wing.)

♀. Length of body, 3.7 mm.; of wing, 3.7 mm. The specimen is rather greasy and is probably darker than is normal.

Head dark, rather blackish brown; mouth rather small, and epis-tome somewhat prominent; proboscis short, labellae large, flexed backwards; palpi thin, flat, leaf-like, yellowish; face flat; antennae not as long as face, dark brownish, upper side of third joint shortened so that the apex is distinctly up-turned; arista brownish, microscopically pubescent; frons slightly longer than wide, rather sunken in centre in specimen; bristles black, three inferior orbitals; ocellar dot blackish; lunule sunken in specimen; occiput blackish centrally, brownish peripherally; occipital bristles whitish, with a row of black setulae on either side.

Thorax entirely dull black, except humeri, base of wings and somewhat between, yellowish; white pubescence and rather pale blackish bristles; dorso-central bristles rather before line of anterior supra-alars. Scutellum black centrally at base, yellow peripherally; with four bristles, the apicals rather the shorter. (It may be noted here that the thorax and scutellum are probably normally clothed with thick grey dust.)

Legs with coxae yellowish, femora black with yellow tips; the front pair, which are more yellow on the inner side, have a row of long brownish bristles behind, two rows of shorter, lighter spines in front, and some thick white pubescence between; other femora with short black pubescence; tibiae and tarsi yellow.

Wings with base hyaline; stigma black, with a milky spot on basal half; veins yellowish hyaline, but darker where touching spots or bands, of which there are the following: Humeral cross-vein slightly darkened with a faint spot on its outer side; a blackish band from stigma to base of third posterior cell, just entering the axillary cell; a band from the end of the marginal cell, which it fills, to hind border of wing, covering the lower cross-vein, but not quite filling the extreme lower corner of third posterior cell; between these two bands are a few spots—a narrow spot across the marginal cell about half-way between; and another below the end of the stigma; the anterior cross-vein is infuscated; in the third posterior cell is an inverted club-shaped spot hanging on the fifth vein; and a spot almost on the wing margin below the end of the sixth vein; at the apex of the wing is a broad spot filling the end of the submarginal cell, extending across the first posterior cell nearly to fourth vein, but not filling the end of the cell. Upper cross-vein beyond middle of discoidal cell and one and a half times its length from lower cross-vein, which is upright with a slight outward curve; lower angle of anal cell acute but not definitely pointed.

Abdomen—in specimen—dull black, but probably normally clothed with white or grey dust; pubescence white; ovipositor dull black, short, not as long as last two segments.

Type a single female specimen from Kaross, S.W.A., February 1825, Mus. Exp.

Terellia australis Bezzi, 1924.

Bez., Ann. S.A. Mus., vol. xix, p. 508, pl. xiv, fig. 53 (1924), as var. of *Terellia planiscutellata* Beck.

As will be recorded by me in a forthcoming paper, I now regard this as a distinct species as the wing is typically spotted towards the apex.

Specimens from South-West Africa were collected at Zesfontein and Warmbad, February 1925, and at Kaoko Otavi, March 1926, Mus. Exp.

Terellia xanthochaeta n. sp.

(Plate I, fig. 3.)

♂♀. Length of body, 2.5 mm.; of wing, 2.5 mm.; of ovipositor, 0.4 mm. Head and all appendages and bristles yellow; head subquadrate; eyes large, rounded-oval, with longer axis directed backwards; mouth broadly elliptical, large, mouth border hardly prominent; proboscis

short; palpi short, beset with strong yellow bristles; face rather narrow and slightly hollowed; antennae short, half the length of the face, third joint about half as long again as broad; arista with thickened basal fourth and terminal thinner portion brownish and bare; frons rather prominent in front, with parallel sides, flat, not quite twice as long as broad (10:6); three inferior orbitals, lower superior orbital brownish, as are also ocellars and post-verticals; ocellar dot greyish; lunule yellow; occiput with slight blackish tinge on sides, swollen below; occipital bristles translucent yellow, thick.

Thorax black, clothed with rather thin greyish dust; humeri and base of wings yellowish; rather long white pubescence; bristles on dorsum brownish; dorso-centrals before line of anterior supra-alars; posterior notopleurals short, thick, and yellow; mesopleurals, pteropleurals, and sternopleurals also yellow, but longer. Scutellum flat, black, paler on margins; with two long brownish bristles; with grey dust and white pubescence. Halteres brownish yellow. Legs brownish yellow, middle tibiae with strong brown spur.

Wings narrow; upper cross-vein sloping slightly outwards, lower cross-vein straight or with slight outward curve and directed inwards; upper cross-vein one and a half times its length from the lower; third and fourth veins parallel, slightly divergent at extreme tips. Wings hyaline, except slight infuscation near apex, on either side of upper cross-vein, and slight spots at ends of marginal and submarginal cells and along length of first posterior cell. In some specimens the markings are practically invisible, in some others they form an almost reticulate pattern, while in all they are very faint, except in a few in which they are rather darker; two costal bristles; veins straw-coloured.

Abdomen black with rather slight grey dust and rather long, thick, yellow pubescence; hind margins of segments narrowly yellowish; male genitalia brownish; ovipositor as long as last two segments, shining brownish-yellow, subtranslucent, with yellow pubescence.

Type ♂ and ♀ and numerous other specimens from Kamanyab, and a few from Kaross, Warmbad, and Otjikondo in South-West Africa, January and February 1925, Mus. Exp.

Terellia complanata n. sp.

(Plate I, fig. 4, wing.)

♂♀. Length of body, 2.8 to 3.2 mm.; of wing, 2.6 to 3.1 mm.; of ovipositor 0.7 mm. Head yellow, wider than high, shortened, the length rather more than half the width (15:27); eyes correspond-

ingly shortened; mouth wide, almost circular, epistome slightly prominent; proboscis yellow, short; palpi yellow, flattened; face yellow, concave; antennae yellow, nearly as long as face, not projecting much beyond contour of front of head in side view; third joint twice as long as broad, flattened on inner side; arista brown on thin apical three-fourths; frons flat, yellow, sloping rather steeply forward and narrowed in front, rather longer than wide at vertex; lunule yellow, wide; occiput yellow, dark brown centrally, not swollen below; bristles—two rather thin brownish inferior orbitals; lower superior orbital long, thin, brown, the upper short, white; ocellars and postverticals brownish, occipitals short, yellow.

Thorax and scutellum covered with thick grey-yellow dust, beneath which the dorsum of thorax is black, with a brown lateral stripe above notopleura and wing base on either side; humeri and pleura yellow; sterna yellow but blackish centrally; scutellum flat, yellow. Mesophragma black. Dorsal bristles brownish, pleural yellowish; dorso-centrals before line of anterior supra-alars; praescutellars closer together than dorso-centrals; scutellum with two long basal bristles and two shorter apicals. Halteres yellow. Legs yellow; front femora swollen and with row of bristles; middle tibiae with strong apical spur. Wings rather milky-hyaline, without spots or other marks; veins pale straw colour; ends of third and fourth veins parallel; upper cross-vein straight, directed outward, one and a half times its length from lower cross-vein, which is almost perpendicular and slightly curved outwards; lower angle of anal cell acute, forming a distinct point; costal bristle double.

Abdomen: first segment yellow, second broadly yellow on distal half, brown or blackish on basal half, or entirely yellow except a brownish spot on centre of hind margin; third (in ♂), third and fourth (in ♀), segments black with grey dust and fairly broad hind margin yellow; last segment black, yellow on hind half; male genitalia yellow; ovipositor brownish yellow, slightly translucent, rather broad, as long as two last segments.

Types ♂ and ♀ and a few other specimens from the Hoarusib River (Otshu), S.W.A., March 1926, Mus. Exp.

Aciura longulior, n. sp.

(Plate I, fig. 5, wing.)

This species closely resembles *Aciura caeca* Bez. from Erythraea (Bez., Bul. Soc. Ent. Ital., vol. xxxix, p. 150, 1908), particularly in the

wing pattern, but the dark stripe along the base of the costa extends beyond the humeral cross-vein, and the femora are broadly black.

♂. Head blackish yellow with black ocellar dot and black occiput ; occipital bristles yellowish, others reddish brown ; three inferior orbitals ; frons rather more than one-third width of head ; face narrow ; antennae yellowish, reaching almost to mouth border, third joint rounded at end ; proboscis short, yellow ; palpi yellow.

Thorax and scutellum shining black, with fine grey dust and white pubescence ; bristles reddish brown ; scutellum with four bristles, apical pair shorter than basal. Halteres black. Legs ; coxae blackish yellow, those of front pair more yellow ; femora rather swollen, more so the first pair, which are shining black on outer aspect almost to knee, but are otherwise yellow ; middle and hind femora broadly banded with shining black for proximal three parts of their length, the distal fourth being yellowish ; tibiae and tarsi yellowish, except hind tibiae which are blackened medially. Wing-pattern very similar to that of *Aciura caeca* Bez., except that the stripe along the base of the costa extends beyond the humeral cross-vein half-way to the stigma ; the basal hyaline area is limited by a line from the stigma to base of anal cell ; stigma black, small, and rounded ; the two hyaline indentations of the fore border are next to the stigma, broadly triangular and separated by a narrow vertical stripe. The apex of the inner triangle just reaches the third longitudinal vein, while the outer just crosses it into the first posterior cell ; the three hyaline indentations of the hind border slope obliquely inwards, the middle being the smallest ; the two outer are more or less parallel sided, but rounded inwardly ; the innermost is irregularly widened towards the base of the wing ; the two inner indentations are in the third posterior cell, just reaching the fifth vein ; the outer, in the second posterior cell, reaches and fills the angle between the posterior cross-vein and the fourth vein.

Abdomen shining black, without grey dust ; pubescence black, except on first segment where it is white ; genitalia shining black.

Type ♂ from Kaross, S.W.A., February 1925, Mus. Exp. ; three other males from Otjiverongo, S.W.A., February 1920, R. W. Tucker ; Gaub, S.W.A., January 1919, R. M. Lightfoot ; and Carnaw (?) E. G. Wit, respectively.

Aciura tetrachaeta Bezzi, 1918, var. *haematopoda* Bezzi, 1924.

There are two males from M'fongosi, Zululand, April and May 1916, W. E. Jones, and a female from De Aar, C.P., October 1917,

L. Péringuey. The latter has the legs reddish as in typical *haematopoda*, but the ovipositor is about twice as long as the body. Two females from South-West Africa (Kamanyab, March 1925, and Otjikondo, January 1925, Mus. Exp.) have the ovipositor short as usual, but of a reddish colour. A male from M'fongosi, Zululand, May 1917, W. E. Jones, and another from Potchefstroom, T. Ayres, have the legs rather blacker than in typical *haematopoda*, but not quite as black as in *tetrachaeta*.

Aciura tetrachaeta Bezzi, 1918, var. *interrupta*, var. nov.

Under this variety is placed a series of specimens which differ from both *tetrachaeta* and *haematopoda* in having the basal costal line broken for a short distance before reaching the stigma, while the legs are reddish as in *haematopoda*. There is a male specimen from Henkries, Bushmanland, November 1911, Lightfoot; three females (Dunedin, Musto; Steynsburg, Cape, April 1914, Lightfoot; and Jackalswater, Bushmanland, Lightfoot) have the ovipositor longer than the abdomen, as in *tetrachaeta*, while a female from Komatipoort, November 1925, R. W. Tucker, has a short ovipositor.

With the available material it is not possible to estimate the exact status of these three forms (*tetrachaeta* Bez., *haematopoda* Bez., and *interrupta* var. n.); the examination of a large series of specimens from various localities, especially in regard to the coloration and the length of the ovipositor, would be necessary.

Aciura angusta Loew, 1861.

There are two females from Kaoko Otavi, S.W.A., March 1926, Mus. Exp., and another from M'fongosi, Zululand, W. E. Jones.

Aciura perpicillaris Bezzi, 1920.

A Central African species; there are some specimens from Mulange, Uganda, November–December 1922, R. Dummer.

SPHENISCOMYIA Bezzi, 1913.

While accepting Bezzi's definition of this genus given on page 123 of vol. xv of the Bulletin of Entomological Research (1924), it is not possible to form an opinion on the validity of Hendel's *Metasphenisca* without an examination of specimens of a species actually placed in the last-named genus. Bezzi seems to consider *quaternaria* Bez., *senaria* Bez., and *quinaria* Bez. as belonging to *Metasphenisca*,

separating them on account of the whitish bristles on the occipital border. This division, however, as seen in Bezzi's table of the species of *Spheniscomyia*, quite erroneously separates *binaria* Lw. from the three species mentioned; the four undoubtedly belong to the same group, and may even be little more than variations of one species—*senaria* Bez., in particular, seems little more than a variety of *binaria* Lw. From an examination of a large series of specimens of *binaria*, *quaternaria*, and *quinaria*, the most that can be said is that in the two latter the occipital bristles have a tendency to be whitish. A revised table of the Ethiopian species follows :—

1. (6) Scutellum with four bristles.
2. (3) Wings with a single hyaline indentation on fore border; the four hyaline indentations on hind border broad and not in pairs
sexmaculata Macq.
3. (2) Wings with two approximated hyaline indentations on fore border; the four posterior indentations short and paired.
4. (5) Three rounded hyaline spots in middle of wing; external posterior indentation not longer than anterior one, and ending at fourth vein
ternaria Lw.
5. (4) No hyaline discal spots; the external posterior indentation longer, extending into submarginal cell *capensis* Rond.
6. (1) Scutellum with two bristles.
7. (8) Only one hyaline indentation on fore border and two on hind border; three hyaline discal spots; base of wing black; halteres black
compacta Bez.
8. (7) Two hyaline indentations (or spots) on fore border; four or more on hind border; base of wing hyaline; one or more hyaline discal spots; halteres whitish.
9. (10) Wings with two regular hyaline indentations on fore border; four, paired, indentations on hind border; only one hyaline spot at base of discoidal cell *neavei* Bez.
10. (9) Two irregular hyaline spots on fore border.
11. (12) Femora entirely yellow; hyaline indentations on fore border about equal in size, *i.e.* both extend into submarginal cell . . . *quinaria* Bez.
12. (11) Femora black; outer hyaline indentation on fore border smaller and not extending into submarginal cell.
13. (16) Hyaline indentations on hind border not fused with discal spots except that at outer end of discoidal cell.
14. (15) Hind border of wing mainly hyaline with only one or rarely two rays to hind margin *binaria*, Lw.
15. (14) Hind border with three rays to hind margin; first posterior cell with a single basal hyaline spot *senaria* Bez.
16. (13) Hind border with three rays to hind margin; hyaline indentations long and broad, and fused with hyaline spots at base of first posterior cell and in the discoidal cell; first posterior cell typically with two hyaline spots *quaternaria* Bez.

Spheniscomyia sexmaculata (Macquart, 1843).

There are several specimens of this widespread species from Warmbad, Zesfontein, Kaoko Otavi, and Kaross in S.W.A., January to March 1925, Mus. Exp.

Spheniscomyia binaria (Loew, 1861).

There are a few specimens from Kaoko Otavi, March 1926, Mus. Exp. They are all typical, having only one ray to the hind margin of the wing.

Spheniscomyia senaria Bezzi, 1924.

Two specimens from Zesfontein, S.W.A., February 1925, and two from Warmbad, S.W.A., February 1925, Mus. Exp., appear to be this species.

Up to the present time the full description of this species does not seem to have been published; the only reference is in Bezzi's table of the species of *Spheniscomyia* on page 124 of vol. xv (1924) of the Bulletin of Entomological Research, and the locality reference (Uganda) on page 125.

SCHISTOPTERINAE.

Schistopterum moebiusi Becker, 1903.

There are a few specimens of this species from the Hoarusib River (Otshu), S.W.A., March 1926, Mus. Exp.

This record is of interest and importance as the species has only been recorded from Egypt. Efflatoun (Mem. Soc. Royale Ent. d'Égypte, vol. ii, fasc. 2, pp. 72-74 (1924)) states that it is common in Lower Egypt.

Bactropota woodi Bezzi, 1924.

Of this curious and interesting fly there are a couple of female specimens from the Hoarusib River (Otshu), S.W.A., March 1926, Mus. Exp.

RHABDOCHAETINAE.

Rhabdochaeta nigra Bezzi, 1924, var. *anteroflava*, var. nov.

♂♀. This form closely resembles *Rhabdochaeta nigra* Bez., but differs in having all the coxae and the front femora yellow, except that on the latter there is a blackish antero-lateral spot of greater or

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The locality Warmbad does not refer to the well known Warmbad in the south of South West Africa, but to a small native village about 10 miles S.E. of Sesfontein in the Kaokoveld. See map in vol. XXV. p. 218.



less extent near its distal end. The third antennal joint is not so dark, nor the distal half of the palpi so black.

There are numerous specimens from Warmbad, S.W.A., February 1925, Mus. Exp.

It may be noted here that the form recorded as *Rhabdochaeta nigra* Bez., by the author in Entomology Memoir No. V (Department of Agriculture, Union of South Africa), page 36, proves to be this same variety.

Rhynchomopterum munroi Bezzi, 1924, var. *major* Bezzi, 1926.

There is a single, rather damaged, male from Kaoko Otavi, S.W.A., March 1926, Mus. Exp.

TRYPETINAE.

Platomma luniferum (Loew, 1861).

Specimens of both sexes from Kaross, February 1925, and from Kamanyab, March 1925, Mus. Exp.

The male is similar to the female, but the abdomen is rather more rusty red, especially the last segment; the genitalia are also rusty red.

Elaphromyia adatha (Walker, 1849).

Of this widespread species there are specimens from Mulange, Uganda, November 1922, R. Dummer; M'fongosi, Zululand, May 1917, W. E. Jones, and Warmbad, S.W.A., February 1925, Mus. Exp.

LEUCOTHRIX, gen. nov.

Allied to *Afreutreta* Bez. and *Platomma* Bez., but distinct owing to the shape of the head and the length of the antennae. Shining black species with thickened white pubescence on most parts of the body.

Head short; occiput concave above, rather swollen below; mouth opening narrowed, epistome thin and somewhat produced; proboscis short and thick with large flattened labellae; palpi large, flat, and broad; face long, narrowed, and concave in the middle, with a large rounded tubercle below base of antennae; frons flat, as long as wide; antennae long, second joint as long as third, the two together equal to the length of the longer diameter of the eye; lunule distinct but closely approximated to base of antennae; ocellar bristles small and

white ; thickened white pubescence covering lower parts of head and sides of face and of frons.

Thorax as long as wide, convex ; black, with faint whitish dust and thickened white pubescence ; dorso-centrals slightly before line of anterior supra-alars. Legs normal ; middle tibiae with one long and two or three shorter apical bristles. Wings relatively short and broad ; venation much like that of *Platomma* Bez. Stigma of medium length ; discoidal cell long and broad, extending beyond middle of wing ; lower angle of anal cell rather blunt and slightly produced ; basal cross-vein much attenuated just before reaching fourth vein ; anterior cross-vein short, slightly before outer third of discoidal cell and about four times its length from lower cross-vein ; lower cross-vein about as long as distance between it and upper cross-vein—almost perpendicular with a slight outward curve ; fifth vein not reaching the wing margin.

Abdomen rather broad, as long as thorax in male, shorter (not including ovipositor) in female ; ovipositor as long as abdomen, wide cone-shaped.

Genotype the following new species.

Leucothrix barbata, n. sp.

(Plate I, fig. 6, wing.)

A black species with thickened white pubescence, peculiarly shaped head, long antennae, and characteristic wing pattern.

♂. Length of body, 3.5 mm. ; of wing, 2.6 mm. Head black, shortened, and eyes lengthened perpendicularly ; occiput concave above, swollen below ; mouth rather elongate oval, epistome with thin margins and somewhat produced snout-like ; proboscis brownish black, thick and short, with large labellae much compressed laterally ; palpi brownish black, flattened, broad, wider distally with rounded corners ; face shining black, long, narrowed, narrower in middle, and hollowed between epistome and large rounded tubercle below base of antennae ; parafacials wide, but narrowed in middle ; antennae separated at base by rather more than width of second joint, blackish brown, third joint almost quite black, long ; second joint as long as first, the two together as long as the longer diameter of the eye, and pendant from the first joint, which is one-fourth the length of the second ; second joint cylindrical with short black setulae ; third joint linear, somewhat flattened, rounded at apex, and more black on

apical half ; arista pale brown, hardly longer than third joint, minutely pubescent, basal fourth thickened ; frons flat, with parallel sides, as long as wide ; lunule close to base of antennae ; chaetotaxy as follows : three inferior orbitals, the lowest slightly below line of the base of antennae, long, thin and brownish ; lower superior orbital long, thin, and brownish, upper short, thick, and white ; ocellars very short, hair-like, white ; inner verticals long, thin, and brownish, the outer short and white ; the few occipitals short, thick, and white, while on either side of upper portion of occipital margin is also a row of black setulae ; the lower half of the occiput, the genae and parafacials and sides of face and frons densely clothed with thickened white pubescence, which is long on the lower parts of the head ; the centre of the face is bare, but on the centre of the frons is some scattered white pubescence ; round the base of the eye, widening behind, is a streak free of white pubescence but clothed with shining silvery dust.

Thorax as long as wide, shining black with faint whitish dust which is thicker on sides, and rather long but not very dense white pubescence. Chaetotaxy normal ; dorso-centrals slightly before line of anterior supra-alars ; mesophragma black ; scutellum black, large, one-third length of thorax, flat, broadly rounded behind ; faint white dust and white pubescence as on thorax ; four brownish bristles of about equal length. Legs black with brownish tinge ; all tarsi pale brown ; halteres blackish ; alulae white. Wings relatively short and broad ; venation much as in *Platomma luniferum* (Lw.). Stigma of medium length ; second vein straight ; third vein undulating on outer half, reaching margin well before apex of wing ; fourth vein ending at apex of wing ; discoidal cell long and broad ; anterior cross-vein short and about four times its length from lower cross-vein ; lower cross-vein about as long as distance between it and the upper cross-vein, almost perpendicular with a slight outward curve ; anal cell drawn out into a rather blunt, slightly produced point ; basal cross-vein much attenuated just before meeting fourth vein. The wing pattern is in the form of a broad band from the base of the wing, filling the space between the costa and the fourth vein, towards the apex of the wing, then turning round sharply towards the base of the wing, fading somewhat and not actually reaching the base ; around the apex of the wing, from, or just before, the end of the third vein, is a large, lunate, whitish-hyaline area, which extends below narrowly and irregularly along the posterior margin ; the inner half of the discoidal cell and the basal cells are also whitish-hyaline ; the anterior portion of the band is brown and has numerous small,

whitish-hyaline spots; around the bend the spots become larger and the colour less intense, while on the posterior portion of the band the spots are so large as to make it broadly reticulate. The veins are brownish, except the whitish terminal part of the fourth vein in the apical lunate area. The microtrichiae are black on the brown parts of the wing, white elsewhere, but the hind marginal fringe is blackish.

♀. The single female specimen (of which the head is missing) is similar to the male. The abdomen (not including the ovipositor) is not quite as long as the thorax; the ovipositor, 1.5 mm. in length, is as long as the abdomen, shining black, with black pubescence, wide cone-shaped, being wide at the base and tapering gradually.

Type ♂ and ♀ and two other ♂♂ from Kamanyab, S.W.A., March 1925, Mus. Exp.

Euaresta striatifrons Mro, var. *oblita*, var. nov.

There is a single female from Zesfontein, S.W.A., February 1925, Mus. Exp., which is described here as a variety of a new species, *Euaresta striatifrons*, to be described elsewhere.*

It agrees with *striatifrons* in wing pattern and in the well-defined striation on the dorsum of the thorax, but differs in the absence of striation on the frons, which is yellow. The examination of additional material may prove this to be a distinct species.

Spathulina semiatra (Loew, 1861), var. *semirufa* Bezzi, 1924.

(Plate I, fig. 7, wing.)

Of this form there is a typical specimen from Nyaka, P.E.A., February 1924, R. F. Lawrence. A couple of specimens from Kaoko Otavi, S.W.A., March 1926, Mus. Exp., have the spots on the wings somewhat enlarged, and they are, in fact, intermediate between *semirufa* and the following new variety. The figure of the wing of *semirufa* is given for comparison.

Spathulina semiatra (Loew, 1861), var. *superhyalina*, var. nov.

(Plate I, fig. 8, wing.)

While *Spathulina semiatra* (Lw.) and the variety *semirufa* Bez. agree in having predominantly black wings, this new variety differs in having the black pattern so reduced that the wings are mainly hyaline; the reduction of the black being effected by the increase in size and the coalescence of the hyaline spots. Further, Loew (Berl.

* Under a new genus, *Insizwa*, in a forthcoming number of the Bulletin of Entomological Research.

Ent. Zeitschr., vol. v, p. 276, pl. ii, fig. 12 (1861)) founded his species *semitra* on a single female, and he describes the abdomen as "shining black." As recorded by Bezzi, and in all the specimens seen by me, the abdomen in both sexes of *semirufa* Bez. is more or less reddish at the base, more so perhaps in the males than in the females. In this new variety, however, the males only have the abdomen reddish, while in the females the abdomen is shining black. Whether or not the greater reddishness of the abdomen in the male of these forms is to be regarded as a sexual character cannot be decided without a greater series of specimens, and at least not until authentic specimens of males corresponding to Loew's female have been examined.

In the wing pattern the hyaline spots and indentations occupy corresponding positions to those in the typical "black" wing. The base of the wing is hyaline; stigma black; two large hyaline spots occupy most of the marginal cell, the outer being broadly confluent with the inner of the two large hyaline spots in the submarginal cell. In the first posterior cell are three spots, the inner above the upper cross-vein but not touching any vein, a median one touching the fourth vein, and a large terminal spot that reaches from the vein above to the one below; the three spots in the second posterior cell are all confluent, only a portion of the division between the lower two remaining; these three confluent spots are also more or less confluent with the spot on the fourth vein in the first posterior cell. The confluent spots in the second basal and the discoidal cells are very large, occupying most of the cells; there is also a relatively small spot (sometimes absent) at the outer end of the discoidal cell. The three large indentations in the third posterior and the axillary cells cover most of the area concerned, and are more or less confluent with one another.

Type ♂ and other specimens from Kamanyab, S.W.A., March 1925, Mus. Exp.; type ♀ from Otjikondo, and a specimen from Kaoko Otavi, S.W.A., March 1926, Mus. Exp.

Spathulina péringueyi Bezzi, 1924.

One female specimen from Tradouw Pass, Swellendam district, Cape, November 1925, Mus. Exp.

Spathulina arcucincta Bezzi, 1924.

The type is a very poorly preserved specimen minus the third antennal joint and the abdomen. There are a few specimens from

Tradouw Pass, Swellendam, November 1925, Mus. Exp., and one from Great Winterhoek, Tulbagh, November 1916, R. M. Lightfoot. The locality of the type is Kraaifontein, Cape—not Kleinfontein.

The following additional descriptive notes are given :—

♂♀. Antennae rather darker yellow than the head, nearly as long as the face, third joint with angular upper corner. Dorsum of thorax with opaque grey dust on which may be seen, especially when viewed rather obliquely from behind, three longitudinal blackish stripes; the median short stripe reaches only to the middle of the thorax, the two outer, on the lines of the dorso-central bristles, widen and become indistinct towards the scutellum; the stripes are more distinct in some specimens than in others; pubescence white. Halteres whitish. Wings with two small costal bristles. The hyaline spots and indentations of the wing pattern vary somewhat as shown in the table (p. 21).

The abdomen in both sexes is shining black, with black pubescence. The shining black ovipositor is rather narrow and slightly longer than the last two segments.

Spathulina elegantula Bezzi, 1924.

A small series of specimens from Tradouw Pass, Swellendam, November 1925, Mus. Exp., and one from Langebergen, Swellendam, 3000–5000 ft., October 1925, K. H. Barnard, agree well with the type specimen. Another specimen, however, from Tradouw Pass, has an additional narrow indentation in the second posterior cell between the normal two. The male is similar to the female.

It may be noted that in this, and in the variety *diminuta* Bez., there is a distinct “apical fork” in the wing pattern.

Spathulina elegantula Bezzi, 1924, var. *diminuta* Bezzi, 1924.

A few specimens from Tradouw Pass, November 1925, Mus. Exp.; from Matroosberg, Ceres, 3500 ft., November 1917, Lightfoot; and from Great Winterhoek, Tulbagh, November 1916, Lightfoot, agree with the type specimen.

ENSINA Robineau-Desvoidy, 1830.

This genus is becoming more and more unwieldy owing to the number and variety of species included in it. In the present paper the wider interpretation employed by Bezzi is followed, as it seems

Table of Variations in SPATHULINA ARCUCINCTA Bez.

	Smaller, outer spot in marginal cell.	Spots at ends of submarg. and 1st post. cells.	Spot at end of 3rd vein in sub-marg. cell.	Spot in 1st post. cell on 4th vein, opposite outer indent. in 2nd post. cell.	Smaller, outer indent. in 2nd post. cell.
Type.	Present.	Narrow, confluent, forming together arcuate band.	Absent.	Absent.	Present.
A.	Small.	Larger and each more arcuate in itself, but still touching.	Absent.	Absent.	Present.
B.	Present.	Still larger, but while still touching there is between them a small, isolated, triangular spot at end of third vein.	A small spot present.	A small round spot touching inner end of lengthened outer spot in 2nd post. cell.	Present, but lengthened.
C.	Present.	Do.	Absent.	Absent.	Present.
D.	Very small, almost vanished.	Quite separate, that at end of 1st post. cell of usual shape, that at end of submarg. small and triangular.	Absent.	A very small spot present.	Absent.
E.	Present.	Almost as in type.	Absent.	Absent.	Quite small.
F.	Absent.	Almost as in type.	Absent.	Absent.	Small.

advisable that before any breaking up of the group is considered a general review of the species should be undertaken.

Ensina barnardi Bezzi, 1924.

In addition to the two females seen by Bezzi, his type and another specimen, there are a few other specimens also from South-West Africa: Windhoek, December 1919, R. W. Tucker; Otjiverongo, February 1920, R. W. Tucker; and Kamanyab, February 1925, Mus. Exp. The species seems to be fairly common in South-West Africa.

A comparison of the type and other specimens with the description calls for the following remarks:—

The proboscis, which Bezzi states to be "about as long as the entire body," is actually only slightly longer than the thorax, or about twice as long as the head. The first basal cell is stated to be unspotted; in both specimens seen by Bezzi, however, there is a small, rather inconspicuous, spot in the outer part of the cell; in seven other specimens the first basal cell is quite unspotted, two have a small spot, and in four the spot is quite conspicuous. As regards the coloration of the body, the thorax and scutellum are so heavily grey-dusted as to appear whitish, except the margins of the scutellum which are blacker. The abdomen is only slightly grey-dusted and, compared to the thorax, distinctly blackish.

The undescribed male is similar to the female. The genitalia are shining black.

Ensina mecistocephala, n. sp.

(Plate I, fig. 9, wing.)

Very similar to *Ensina barnardi* Bez. in size and wing pattern, but with a much more elongated head.

♂. Length of body and of wing, 4.5 mm. Head much depressed and very elongate wedge-shaped, three-quarters as high as long; eyes oval, with long axis directed backwards; peristome very prominent, projecting beyond outer edge of antennae by a distance equal to the width of the third antennal joint; yellowish, with a blackish mark below face. Face narrow, strongly incurved owing to prolongation of peristome; yellow on sides, with a dark brown median stripe. Parafacials very wide, twice as wide as width of third antennal joint, yellow, but broadly blackish towards eye, and with a deep brown, kidney-shaped, longitudinal spot at top. Frons

long and narrow, with parallel sides, slightly hollowed, twice as long as wide; yellow and narrowly grey on sides anteriorly, posteriorly broadly grey on sides, yellow centrally, with a narrow dark median stripe; vertex, including ocellar dot, grey. Lunule large, but relatively smaller than in *Ensina reticulata* n. sp., depressed, dark brownish with black centre, covered with fine grey dust. Antennae not quite as long as face; all joints brownish, as is thickened basal fourth of arista, terminal portion of arista darker; third joint of antenna rounded apically. Palpi narrow, flat, not spatulate, extending well beyond peristome. Proboscis with basal portion blackish and as long as head; apical portion yellow, and about one-seventh longer than basal. Chaetotaxy: three inferior orbitals, verticals and lower pair of superior orbitals brown; upper pair of superior orbitals, post-verticals, and occipitals white (most of the occipitals are missing in the specimen); bristles and hairs on lower parts of head white.

Thorax and scutellum entirely dull black, except humeri, base of wings, and a small spot between, yellowish. Dorso-centrals on line of anterior supra-alars; praescutellars present. It is to be noted that the specimen is rather damaged and had become greasy; the dull black appearance of the thorax is due to this; after a comparison with fresh and greasy specimens of *Ensina barnardi* Bez. it is most probable that in this species, too, both thorax and scutellum are normally covered with thick grey dust, with probably three more or less fuscous longitudinal lines on the dorsum of the thorax. The thorax and scutellum have also been denuded of most of the white pubescence. On the scutellum were four bristles, all probably of equal length. Halteres yellow. Legs with the coxae brownish black; all femora black except on distal ends yellow, least yellow on front femora; all tibiae brownish yellow and tarsi yellow. Wing very similar in pattern to that of *Ensina barnardi* Bez., but blacker and with hyaline spots small. Base of wing from stigma to outer end of anal cell hyaline; stigma yellow, brownish at outer end; two triangular, adjacent, hyaline spots next to stigma, the apex of inner reaching second vein, of outer not quite; a fair-sized spot near end of marginal cell; submarginal cell subhyaline brownish at base, otherwise unspotted except for ends of costal indentations noted; first basal cell unspotted; first posterior cell with two small hyaline spots, one about inner third midway between veins and one touching fourth vein at outer third; immediately above this, touching the third vein, is another spot which is only just perceptibly hyaline; discal

cell with three small round spots—one touching fourth vein at inner quarter, one just above fifth vein about middle, and one at outer quarter about midway between the longitudinal veins; second posterior cell with a small irregular, and two larger, marginal indentations; third posterior and axillary cells together with a wide, two-pointed, marginal indentation, which has a dark spot about its middle on wing margin; anterior cross-vein about its own length from lower, and each narrowly edged with subhyaline yellowish; lower angle of anal cell acute.

Abdomen and genitalia black, rather shining, with very slight indication of grey dust.

Type ♂, a single specimen from Koabendus, S.W.A., January 1926, Mus. Exp.

Ensina reticulata, n. sp.

(Plate I, fig. 10, wing.)

Closely allied to both *Ensina barnardi* Bez. and *Ensina mecistocephala*, n. sp., especially in the peculiar elongation of the head, but differing in having a typical *Ensina*-like reticulate wing pattern.

♂♀. Length of body, 4.5 mm.; of wing, 4.3 mm.; of ovipositor, 1.0 mm. Head much depressed and elongate, wedge-shaped, not quite twice as long as high; eyes oval, long axis directed backwards; mouth border very prominent, channel-like, but hardly projecting beyond line of outer edge of antennae; face narrow, whitish; parafacials as broad as third antennal joint, whitish but with a subtranslucent, blackish spot near middle and a brown, elongate spot at top; peristomalium whitish; frons elongate, with parallel sides, not quite one and a half times as long as wide, flat, yellow centrally in front, with some very fine golden pubescence, slightly blackish grey at sides and behind, ocellar dot black; lunule very large, grey, swollen; occiput yellow, broadly black in centre; antennae as long as face, first two joints yellowish, third reddish, second joint prominent, third rounded apically; arista with thickened basal fourth yellowish, distal three-fourth brown and very finely pubescent; palpi flattened, narrow, projecting slightly beyond mouth border; proboscis yellowish, long, about twice as long as head, the terminal portion being as long as the basal; bristles on occiput thick and white, yellowish on lower side of head, remainder brown.

Thorax elongate, with five longitudinal fuscous stripes separated by grey. The two lateral lines extend from humeri above wing bases and end rather diffusely on scutellum; the three median lines converge

before reaching scutellum; bristles brownish, and on dorsum are situated on the longitudinal lines where the alveoli are ring-like, and are surrounded by small brown areas; pubescence white; dorso-centrals on line of anterior supra-alars. Scutellum greyish centrally, more fuscous laterally; with four brownish bristles of equal length. Pleura and sterna blackish, with rather sparse white pubescence and some longish, flattened, white hairs on humeri and propleura. Mesophragma blackish. Legs entirely yellow except dark spots near extremity of middle and hind femora.

It is to be noted that the male type is greasy and the thick dust on dorsum has disappeared. The dorsum is dull black, the rest of the thorax is dull, rather dark, yellow. The scutellum, except extreme dull black base, is also yellow.

In the female type the abdomen, except the last segment, is dull reddish yellow, darker on anterior half, and with a more or less well-defined, median, darkish line; pubescence golden; last segment shining reddish yellow, with the pubescence very fine medially. Ovipositor shining black, triangular, as long as last three segments, with blackish pubescence. In the damaged male type the abdomen seems to have been covered with thick dust rather more greyish than in the female. The denuded portions of the abdomen are reddish, the anterior and posterior margins of the segments blackish; with short yellow pubescence; on the posterior margin of last segment are a few thin bristles; genitalia rather shining yellow.

Wing: cross-veins rather approximated, the upper its own length from the lower; third and fourth veins strongly convergent towards apex of wing; veins pale yellowish, but darkened where markings touch them; pattern reticulate, narrow, and pale; stigma black, with broad yellow subhyaline spot at inner third; the reticulation of the discoidal cell is well marked.

Types ♂ and ♀, Zesfontein, S.W.A., February 1925, Mus. Exp.

Ensina sororcula Wiedemann, 1830.

Numerous specimens from Kaoko Otavi, S.W.A., March 1926, Mus. Exp.; Warmbad, S.W.A., February 1926, Mus. Exp.; and a couple from Mulange, Uganda, November 1922, R. Dummer.

Ensina gladiatrix Bezzi, 1920.

There are several specimens from Tradouw Pass, Swellendam district, November 1925, Mus. Exp., and one from Zesfontein,

S.W.A., February 1925, Mus. Exp., which I refer to this species. It seems, however, that this and *Ensina liliputiana* Bez. may be only varieties of one species, *E. liliputiana* being the smaller and darker.

The wing pattern in *E. gladiatrix* shows some variation: the hyaline spot at the end of the first posterior cell is often confluent with the one before it in the same cell and with the ones above and below it.

Ensina liliputiana Bezzi, 1924.

Two specimens from Tradouw Pass, Swellendam district, November 1925, Mus. Exp., may be placed here. They are very similar to some of the specimens of *Ensina gladiatrix* Bez. recorded from the same locality, but the hind tibiae are distinctly blackened, although not quite as much as is the case in the type specimens. Further, they are rather larger than the types.

Ensina hyalipennis Bezzi, 1924.

There are several specimens of this species from Tradouw Pass, Swellendam district, November 1925, Mus. Exp., and a pair from Kaoko Otavi, S.W.A., March 1926, Mus. Exp.

In comparing the type specimen with the description, it is difficult to understand the reference to the length of the proboscis being as "long as the body"; from actual measurements, the length of the body, 2.5 mm., given in the description, is found to be the extreme length from the front of the head to the end of the ovipositor. Further measurements show that the proboscis is two-thirds the length of the body, or not quite three times the length of the head. The body and wing lengths are approximately equal, but the body is often difficult to measure owing to its bent position. Wing lengths vary from 2.3 mm. to 3.4 mm.

In some specimens the frons and lunule are yellow, but this seems to be due to discoloration. The abdomen, both in the type and in other specimens, is shining black with rather long, pale yellowish pubescence as stated by Bezzi.

The undescribed male is similar to the female. The genitalia are rather dull black.

Ensina anceps Loew, 1861, and var. *fasciolata* Bezzi, 1924.

Two specimens from Kaoko Otavi, March 1926, Mus. Exp., belong to the *anceps* form, that is, there are three hyaline spots in the marginal

cell beyond the stigma. Three from Tradouw Pass, Swellendam, November 1925, Mus. Exp., and one from French Hoek, December 1917, K. H. Barnard, belong to the form *fasciolata* Bez., having only two hyaline spots in the cell mentioned.

For reasons similar to those stated under *Ensina ignobilis* (Lw.) it does not seem that the separation of *fasciolata* as a variety is justified.

Ensina myiopitoides Bezzi, 1908.

There is a specimen from Kamanyab, S.W.A., March 1925, Mus. Exp., and three from Matroosberg, 3500 ft., Ceres district, November 1917, Lightfoot.

The species is variable in size, wing lengths varying from 2.1 mm. to 3.3 mm.

Ensina ignobilis Loew, 1861, and var. *plebeja* Bezzi, 1924.

Among numerous specimens collected by the Museum Expedition in the Tradouw Pass, Swellendam district, in November 1925, it is interesting to note that only one or two have the stigma spotted, that is, the majority belong to the species *ignobilis* Lw., and not to Bezzi's variety *plebeja*. A few specimens, however, from South-West Africa (Warmbad, February 1925; Kaoko Otavi, March 1925, Mus. Exp.) have all the stigma spotted and so belong to the variety (*cf.* Munro, Entomology Memoir, Union Dept. of Agric., No. 5, 1926, p. 26).

From a consideration of this material and of many specimens in my own collection, it hardly seems that the separation of the variety *plebeja* on account of the spotted stigma is justified. The species (*ignobilis* Lw., s. l.) is one that shows great instability, both as regards wing pattern and also in the intensity of the coloration of the pattern.

Typically the wing pattern is reticulate and covers the outer two-thirds of the wing surface; the markings are fainter and less defined in the discoidal and third posterior cells; the hyaline spots are rounded, but vary individually very much in size, tending to become confluent. Points to be remarked are that in the marginal cell, beyond the brown spot below the stigma, there are, as a rule, three hyaline spots, but occasionally four or only two; the hyaline spot at the outer end of the first posterior cell is practically constant in all specimens; the stigma is the darkest part of the wing and may be almost black, the spot may be quite small, or cover almost half the area of the stigma, while further, as noted by Bezzi, it may be absent

on one wing and present on the other of the same specimen ; the inner corner of the stigma is more often than not hyaline.

The main line in the reduction of the pattern, as shown in several specimens, is in the confluence of the hyaline spots with those above and below in adjacent cells, resulting in the wing becoming more or less banded in appearance, but the bands are never so clearly defined as those on the wings of *Ensina anceps* Lw.—the fact that the spots have coalesced is always apparent. In two or three specimens the reduction of the pattern and of the intensity of the coloration have proceeded so far that the wing resembles that of *Ensina sororcula* (Wd.).

In the majority of the specimens the femora are black, except for the extreme distal ends, but in a few the black is more restricted.

It may thus be concluded that only one variable species is under consideration ; a closer study, however, especially a comparison of allied species, may reveal facts necessitating a revision of this conclusion.

Ensina hieroglyphica Bezzi, 1924.

One specimen from Swellendam, October 1925, K. H. Barnard.

Sphenella marginata Fallen, 1820, and var.
melanostigma Bezzi, 1908.

Of this widespread species there are a few specimens from Tradouw Pass, Swellendam district, November 1925, Mus. Exp.

I am unable to regard *melanostigma* Bez. as more than a variety of *marginata* Fall., if indeed it is not but little more than a variation. In the present material some of the specimens have the stigma entirely black, but the apical black spot in most has a distinct tooth ; it is remarkable that, in spite of the fewness of the specimens, they show quite a wide range from spotted to unspotted stigma and toothed to untoothed apical fuscous band.

Sphenella nigricornis Bezzi, 1924.

There is a single male specimen from Willowvale, Cape, 6.1.17.

With regard to the description of the type, it may be noted that the frons is as long as width at vertex, and not twice as long as broad.

Euribia praetexta Loew, 1861.

There is a single specimen from Mulange, Uganda, November 1922, R. Dummer.

Euribia caffra Loew, 1861.

This species, together with *Euribia dissoluta* (Lw.), *Euribia tristrigata* Bez., and *Euribia cyana* (Walk.), seem to be variations of one species. Without, however, much more material and more detailed anatomical studies it is not possible to make any definite decision. The species are distinguished on differences in wing pattern, but, as is the case with various groups of *Ensina*, etc., the wing pattern is very inconstant.

According to Bezzi's tables (Bulletin of Entomological Research, vol. xv, p. 138) *Euribia caffra* is the form in which the markings on the wings are arranged so that there is a more or less definite band across the middle of the wing, and the hyaline spot at the end of the first posterior cell is small ("much narrower than the space between the third and fourth longitudinal veins"—Bezzi). Specimens in my own collection, and one in the South African Museum collection determined by Bezzi, show this spot nearly as wide as the space mentioned. The band across the wing is, as a rule, well defined, especially when examined with the naked eye.

There is a specimen from Mulange, Uganda, November 1922, R. Dummer, which is a typical *Euribia caffra* (Lw.).

Euribia tristrigata Bezzi.

Of specimens that may be referred to this species I have only seen five. There are three in the present material—one from Durban, September 1920, C. P. van der Merwe; one from Kaoko Otavi, S.W.A., March 1926, Mus. Exp.; and one from Mulange, Uganda, November 1922, R. Dummer.

It is, therefore, not possible to judge much of the wing-pattern variation, nor to compare them with typical *Euribia caffra* wings. In all there is a band across the wing, especially on naked-eye examination, but it is much less definite than in *caffra*. The spot at the end of the first posterior cell in the Durban and Kaoko Otavi specimens is large, touching both the third and fourth veins. In the Uganda specimen the spot, while large, does not reach either vein. It should be noted further that the Uganda and Kaoko Otavi specimens might

well be regarded as *Euribia dissoluta* Lw., as the stripes on the dorsum of the thorax are practically absent. The appearance of the stripes on the thorax depends on the state of preservation of the specimen. Loew (Berl. Ent. Zeitschr., vol. v, p. 291, 1861) states "Die Oberseite des Thorax nur mit einer sehr undeutlichen Spur von Längslinien" in the case of *dissoluta*, while, in his description of *tristrigata*, Bezzi (Bull. Ent. Res., vol. ix, p. 37, 1918) says, "On the back (of thorax) there are three well-marked longitudinal stripes." In this connection it is interesting to note that an examination of a series of *Euribia caffra* (Lw.) shows that in fresh, well-preserved specimens there are also three similar longitudinal stripes on the dorsum of the thorax; for some reason, however, specimens tend to become greasy, and then the lines practically disappear, or are difficult to see except anteriorly. It is inferred, therefore, that Loew happened to have a badly preserved specimen, but definite information could only be obtained from an examination of the type if it is still in existence.

There does not seem to be any other character except the thoracic stripes on which to separate *dissoluta* Lw. and *tristrigata* Bez. It may be noted that Bezzi (Ann. S.A. Mus., vol. xix, p. 558, 1924) actually saw no specimens he could consider to be *dissoluta* Lw., but considered his *tristrigata* might only be a form of it.

Acanthiophilus hessei, n. sp.

(Plate I, fig. 11, wing.)

A distinct species with a well-defined, dimidiate, reticulate wing pattern.

♂♀. Length of body and of wing, 3.0 to 3.4 mm. in males and 3.7 to 3.8 mm. in females. Head shorter and wider than high, yellow, occiput black centrally; frons narrowed in front, rather more so in male than in female, as long as wide at vertex, yellow in front and centrally with paler yellow margin round lunule, posterior corners broadly darker yellow; ocellar dot blackish; slight yellow pubescence in middle anteriorly, and a line along sides of frons; lunule wide, yellow, with its margins marked with sharply impressed lines. Chaetotaxy: postverticals, upper superior orbitals, occipitals, and hairs on lower side of head yellow; verticals, ocellars, lower pair of superior orbitals, and the two pairs of lower orbitals, black. Antennae as long as face, rather darker yellow than head, third joint broadly rounded at end. Proboscis yellow, short, geniculate, distal portion two-thirds length of basal; palpi short, flat.

Thorax with dorsum rather shining black, but normally covered with thick yellow dust, together with closely set white pubescence. Bristles black; dorso-centrals before line of anterior supra-alars. Pleura and sterna black, except yellowish wing bases, with less grey dust, and less, but often longer, white pubescence, than on dorsum. Pteropleural bristles whitish. Halteres yellow. Scutellum flat, shining yellow, with very fine yellow dust, some short yellow pubescence, and four black bristles of equal length. Mesophragma black with fine grey dust.

Abdomen in the male rather shining black, finely grey-dusted, with narrow yellow posterior margins to segments—yellow margins wider on venter; white pubescence and a few dark bristles on posterior margin of last segment. Genitalia large, rounded, as wide as posterior margin of last segment and visible from above; shining black with slight white pubescence. In the female the abdomen is covered with yellow or white pubescence, which is longer on posterior margins of segments and is darkened on posterior margin of last segment. The first segment is black with yellow posterior edge, but more or less thickly covered with yellow dust; second segment with yellow posterior margin and more or less thickly covered with yellow dust on sides only; third and fourth segments black with yellow posterior margins; fifth segment with yellow posterior margin wider, almost half the width of the segment; all the black on the abdomen is finely covered with grey dust. Ovipositor trapezoidal, short—only slightly longer than last segment, shining black with white pubescence on basal portion and fine black pubescence on distal portion. Venter blackish with short yellow pubescence.

Wings strongly dimidiate, having a rather pale but well-marked brown pattern restricted to above the fourth vein from base to apex; below this vein there is a slight reticulation at the end of the discoidal cell, and odd brown spots in the third posterior cell. The pattern is reticulate with numerous rather small hyaline spots arranged conspicuously along adjacent sides of veins. Stigma black, but with a large yellow spot at outer third, and the base yellow to a greater or less extent.

Type ♂ and ♀ and some other specimens from Tradouw Pass, Swellendam district, November 1925, Mus. Exp.

Trypanea peregrina (Adams, 1905).

There is one specimen from Kamanyab, S.W.A., March 1925, Mus. Exp.

Trypanea bulligera Bezzi, 1924.

There are specimens of both sexes from the type locality, Great Winterhoek, Tulbagh, April 1916, R. M. Lightfoot; one from French Hoek, December 1917, K. H. Barnard; and one from Tradouw Pass, Swellendam district, November 1925, Mus. Exp.

A comparison of Bezzi's type female with the specimens of females represented here reveals the fact that he has inadvertently described the female of his *Trypanea euarestina* as the female of *Trypanea bulligera* (Ann. S.A. Mus., vol. xix, pp. 563-564, 1924). In the genuine females of *T. bulligera* there is an identical "bulla" as is present on the wing of the male. The error seems to have arisen owing to the fact that occasionally two or three specimens—often of different species—were pinned on one mount; in this case a male *bulligera* and a female *euarestina* had been placed together. It is perhaps wise not to pin more than one specimen on a single mount unless it is a pair actually taken *in copula*, a fact which Bezzi evidently assumed in the present instance.

With regard to the male the following additional notes are given: The frons is only a little longer than wide (9:8), and not one and a half times as long as wide as stated by Bezzi. In some specimens there is a faint median greyish stripe on the frons. The abdomen is only covered with cinereous dust on the first segment, the remainder are more shining black with very little dust. In the wing the third vein is curved *forward* just *above* the "bulla."

The characters of the female are: Length of body and of wing, 3.6 to 4.0 mm. The frons is a little longer than broad (10:8), and thus a little narrower proportionately than in the male; it is yellow with a wide, distinct, median, grey-dusted stripe, narrowing from the blackish ocellar dot, which is also grey-dusted, to the lunule; sides of frons grey-dusted, and appearing shining white from certain angles, especially from behind. The abdomen has cinereous dust on first segment, the remainder being rather dull shining black with slight dust. Pubescence white. Venter more reddish. Ovipositor shining black with white pubescence; rather narrowed, with rounded end, and as long as last two segments. Legs as in male. Wings as in male, that is, there is also present a peculiar rounded "bulla" just before the middle of the first posterior cell, and the third vein is curved forward just above the bulla. The cross-veins are close, being less than the length of the upper apart; lower angle of anal cell is rectangular. Wing pattern as in male.

Trypanea euarestina Bezzi, 1924.

(Plate I, fig. 12, wing.)

Trypanea bulligera Bez., female (Ann. S.A. Mus., vol. xix, p. 563, 1924).

Very like *Trypanea bulligera* Bez., but differing by the absence in both sexes of the peculiar bulla on the wing. There are several specimens of both sexes from Winterhoek (3600–3800 ft.), Tulbagh, April 1916, R. M. Lightfoot.

As the type specimen is in very poor condition the following notes, on both sexes, have been made, apart from the fact that the female was described by Bezzi as the female of *Trypanea bulligera*.

♂♀. The antennae are shorter than the face; palpi short, thick, flattened, and curved; the basal portion of the proboscis is longer than the mouth, and the apical shorter than the basal. The abdomen is shining black, and wholly grey-dusted, but less densely than on the thorax, and with white pubescence. The wing is very similar to that of *T. bulligera*, but, as stated above, the bulla is absent in both sexes and the third vein straight; the cross-veins are a little more than the length of the upper apart, and the lower angle of the anal cell is distinctly acute; the wing pattern is also very similar to that of *T. bulligera*, but the stigma is slightly infuscated along the costa, and the bar across the discoidal cell is not prolonged beyond the fifth vein in any of the specimens examined. Genitalia black. Ovipositor shining black, flattened, and as long as the last three segments.

With regard to Bezzi's figure of the wing of this species (Ann. S.A. Mus., vol. xix, 1924, pl. xv, fig. 121) it is to be regretted that it is drawn rather out of proportion; a fresh drawing is given here.

Trypanea luctans, n. sp.

(Plate I, fig. 13, wing.)

Very similar to both *Trypanea bulligera* Bez. and *Trypanea euarestina* Bez. in wing pattern; it differs from *T. bulligera* in the absence of the bulla on the wing, and from *T. euarestina* in having the lower angle of the anal cell a right angle.

♀. Length of body, with ovipositor, 3.5 mm.; of wing, 3.0 mm.; of ovipositor, 0.8 mm. Head pale yellow; frons slightly longer than broad, flat, with parallel sides, yellow centrally and in front, greyish behind and with grey margins; ocellar dot blackish; lunule yellow. Epistome slightly projecting, mouth wide; proboscis rather darker

yellow, geniculate, basal portion as long as mouth, apical half length of basal ; occiput black centrally, yellow on sides. Antennae rather darker yellow, shorter than face, third joint broad and rounded. Chaetotaxy : two pairs of lower orbitals, lower pair of superior orbitals, ocellars, verticals, and genal black ; upper pair of superior orbitals, occipitals, and hairs on lower part of head white.

Thorax : dorsum bluish black with cinereous dust, except humeri yellowish ; rather sparse white pubescence and black bristles ; dorso-centrals much before line of anterior supra-alars. Pleura and sterna bluish black with some yellow dust and yellow pubescence. Scutellum as thorax ; with two bristles. Legs entirely yellow. Wings : distance between ends of first and second veins relatively much shorter than same distance in both *T. bulligera* and *T. euarestina* ; cross-veins approximated, being less than the length of the upper cross-vein apart ; lower angle of anal cell a right angle ; costal bristle double. Wing pattern of same type as in *T. bulligera* and *T. euarestina*, that is, stigma broadly united to dark pattern which extends well towards base of wing. The apical fork is complete ; two streaks extend across second posterior cell—one along lower cross-vein and one across outer end of discoidal cell—all reaching margin of wing. At end of submarginal cell are two marginal hyaline indentations, and two along costa into marginal cell, the one next to the stigma being relatively much shorter than the corresponding mark on the wing of the two species already mentioned ; stigma broadly infuscated along costa, and discoidal cell broadly infuscated along its upper half. Abdomen shining black, somewhat dusted with bluish cinereous basally and with black pubescence ; venter rather dull black. Ovipositor shining black, with black pubescence ; flat ; rather longer than last two segments.

Type ♀ from Matroosberg, 3500 ft., Ceres district, November 1917, R. M. Lightfoot.

Trypanea confluens (Wiedemann, 1830).

Of this common species there are a few specimens from Kaoko Otavi, S.W.A., March 1925, Mus. Exp. ; one from the Hoarusib River (Otshu), March 1926, Mus. Exp. ; and one from Tradouw Pass, Swellendam district, November 1925, Mus. Exp.

Trypanea woodi Bezzi, 1924.

There is a male from Kaoko Otavi, S.W.A., March 1926, Mus. Exp.

Trypanea amoena (Frauenfeld, 1856).

A single female specimen from the Hoarusib River (Otshu), S.W.A., March 1926, Mus. Exp., appears to be this European species. The specimen is unfortunately rather damaged, but the wing pattern is practically identical with the figure given by Bezzi in the Memoirs of the Indian Museum, vol. iii, pl. x, fig. 70, except that the stigma is yellowish hyaline, with a dark spot on the costa at the end of the axillary vein. Further, a comparison with European specimens reveals the same slight difference.

Trypanea amoena (Frff.) is widespread throughout Europe and the entire Oriental Region as far as the Philippines. It is common in Egypt, and has been recorded by Bezzi from Erythrea.

Trypanea superdecora Bezzi, 1924.

There is a single specimen from Kaoko Otavi, March 1926, Mus. Exp.

Trypanea bisreducta Bezzi, 1924.

Three specimens from Kaoko Otavi, S.W.A., March 1926, Mus. Exp., agree with the type in the reduced pattern, with only a rudimentary tooth projecting into the second posterior cell. A specimen from Zesfontein, S.W.A., February 1925, Mus. Exp., has two short, but distinct, rays into the second posterior cell, and in this it agrees with a specimen in my collection determined as *bisreducta* by Bezzi, but it may be noted that they apparently run down to *aira* (Walk.) in Bezzi's tables on pages 141-143 of vol. xv of the Bulletin of Entomological Research. It may be suggested here that not only *bisreducta* Bez. and *aira* (Walk.) but also *stellata* (Füssl.) are forms of one species. No definite statement can, however, be made without adequate material for study.

Two further specimens from Tradouw Pass, Swellendam district, November 1925, Mus. Exp., are also referred here, and they agree with a specimen in my collection which Bezzi considered as probably *bisreducta*. They differ from the type in having the black spot at the end of the wing larger and more intense black; the short streaks radiating from it are thicker, so that there is a complete hyaline spot opposite the top end of the lower cross-vein. Further, there is a short, broad tooth projecting into the second posterior cell, and in one specimen this encloses a hyaline dot. In my specimens, and in one

from Tradouw Pass, there are no hyaline dots on the black, but in the other Tradouw Pass material there is a small hyaline dot at the top just below the end of the marginal cell. There are no structural differences in the wing venation in the various specimens.

Trypanea maculaminuta, n. sp.

(Plate I, fig. 14, wing.)

The species is characterised by the extreme reduction of the apical spot on the wing, which is otherwise quite hyaline. It is much like the European *Trypanea eluta* (Meig.) in appearance, but is distinguished by having only two scutellar bristles.

♂♀. Head pale yellow; eyes large, rounded; occiput yellow with central black spot; mouth large, round, mouth border slightly projecting; palpi and proboscis short, labellae large; face narrow; antennae not quite as long as face, third joint darker yellow, with sharp upper angle; frons about one and a half times as long as wide at vertex, rather narrowed in front, yellow centrally with broad grey border and grey ocellar dot; three inferior orbitals; occipital bristles white, other bristles brownish; lunule yellow.

Thorax, scutellum, and abdomen covered with blue-grey dust and white pubescence; humeri yellowish; bristles brownish, dorso-centrals before line of anterior supra-alars; scutellum with two long bristles. Halteres white. Legs yellow, front femora swollen and with a row of yellow bristles.

Ovipositor shining black, triangular, rather longer than last two segments; with white pubescence.

Wings with normal venation; cross-veins slightly farther apart than length of upper. Hyaline with greatly reduced pattern; stigma slightly infuscated along costa, or more or less wholly, but faintly, infuscated; costa dark along basal half of stigma; upper and lower cross-veins darkened; a faint dark bar at middle of distance between ends of second and third veins extends in female type across marginal cell, and in male type and other specimens across submarginal cell as well; the infuscated spot at apex of wing covers the end of the marginal cell for one-third of the distance between ends of second and third veins, extends across submarginal cell and one-third of way across first posterior cell, where it narrows abruptly before continuing to fourth vein; on the inner side of this narrowed portion is a half-enclosed hyaline spot; in one specimen there is a ray to the top of lower cross-vein which practically encloses this spot. The costa is



1. *Rhacoclaena permagna* Mro.



2. *Terellia nigrofemorata* Mro.



3. *Terellia xanthochaeta* Mro.



4. *Terellia complanata* Mro.



5. *Aciura longulior* Mro.



6. *Leucothrix barbata* Mro.



7. *Spathulina semirufa* Bez.



8. *Spathulina superhyalina* Mro.



9. *Ensina mecistocephala* Mro.



10. *Ensina reticulata* Mro.



11. *Acanthiophilus hessei* Mro.



12. *Trypanea euarestina* Bez.



13. *Trypanea luctans* Mro.



14. *Trypanea maculaminuta* Mro.

SOUTH AFRICAN TRYPETID DIPTERA.

darkened from the infuscation at the end of the marginal cell to the end of the fourth vein. In some specimens the intensity of the infuscation is so reduced as to be only just discernible, and the terminal spot is reduced to more or less slightly infuscated spots between the veins.

Type ♂ and ♀ and some other specimens from Warmbad, S.W.A., February 1925, and one specimen from Kaoko Otavi, March 1926, Mus. Exp.

Trypanea decora (Loew, 1861).

There are three typical specimens from Tradouw Pass, Swellendam district, November 1925, Mus. Exp.

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2. *Contributions to a Knowledge of the Fauna of South West Africa.*
 VIII. *Records and Descriptions of Acrididae from South West Africa.*—By B. P. UVAROV, Imperial Bureau of Entomology.

(With Plate II and 12 Text-figures.)

THE present paper is based on a collection of South West African *Acrididae* submitted to me by Dr. E. L. Gill, Director of the South African Museum, and Dr. A. J. Hesse, of the same Museum. I wish to express here my thanks to both these gentlemen for the opportunity given me to study the interesting material.

The Orthopterous fauna of South West Africa seems to be very rich generally and in highly peculiar forms, but it is still imperfectly known.

Its study begun with Stål, who had some material from Ovambo-land and Damaraland; * Karsch † also published a short list of Orthoptera of the latter country. The next paper, by Krauss, ‡ also contains a list of species taken at several places in South West Africa, but all these lists are much shorter than that published by Karny, § which includes a large number of records and descriptions of many new species and genera. Unfortunately, the descriptions are all exceedingly brief, while the illustrations of new forms on the plate are quite useless, being not more than the roughest of sketches, so that most of Karny's species published in that paper remained unrecognisable. As a result, some of them have been recently described by me || under other names, and I am glad to be able to establish their correct synonymy now, when I have had an opportunity to study the types

* Stål, C., "Bidrag till södra Afrikas Orthopter-fauna."—Öfver. K. Vet.-Akad. Förhandl., 1876, No. 3, pp. 29–76.

† Karsch, F., "Verzeichniss der von Herrn Waldemar Belck, 1885, in Damaraland gesammelten Orthopteren."—Entom. Nachr., xiii, 1887, pp. 39–46.

‡ Krauss, H. A., "Beitrag zur Kenntniss der Orthopteren Deutsch-Südwestafrikas."—Verh. zool.-bot. Ges. Wien, li, 1901, pp. 281–293.

§ Karny, H., "Orthoptera," in Leonard Schulze, "Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Südafrika."—Denkschr. med.-nat. Gesellschaft, Jena, xvi (4), 1910, pp. 35–90, 1 plate.

|| Uvarov, B. P., "On some new short-horned grasshoppers (*Acrididae*) from South Africa."—Ann. Natal Museum, v, 1925, pp. 159–187, 24 figs.

of Karny's species, kindly sent to me by Professor Dr. W. Ramme, of the Berlin Museum. I hope that the present paper will be a useful supplement to that of Karny.

The paper does not include the whole of the South West African *Acrididae* received from the Cape Town Museum, because I thought it better to defer the determination of species of certain difficult groups until it becomes possible to study the groups critically on the basis of a larger material from various parts of South Africa; I hope to have this opportunity before very long, as I am undertaking to work out the whole collection of the Cape Town Museum. The groups and genera left partly, or wholly, out of the present paper are Pamphaginae (except a new species of *Charilaus*), most of the Caliptamini, genera *Acrotylus*, *Methone*, and a few others.

Apart from the Cape Town material, I have included in the paper some records of the species collected recently in South West Africa by Mr. R. E. Turner and presented by him to the British Museum. I am very grateful to Mr. Turner for the attention he paid to the collecting of Orthoptera at my special request; it will be seen from the text that he succeeded in discovering some very interesting species.

The types of the new species (except when unique) have been presented to the British Museum (Natural History); the unique types and paratypes of other species are in the South African Museum, Cape Town.

All illustrations for the paper have been made by Mr. D. E. Kimmins, and I am very much obliged to him for the careful execution of the work.

SUBFAMILY ACRIDINAE.

Genus *ACRIDELLA* I. Bolivar.

Acridella rendalli (Kirby).

South West Africa: Windhoek, 1919, 1 ♀; Tsumeb, December 1919, 2 ♀♀ (R. W. Tucker).

Apart from the striking coloration of the hind wings, this species is remarkable for its very long and narrow antennae, even in the female sex, the male being still unknown.

Acridella serrata (Thunberg).

Windhoek, November 1920, 1 ♀ (S. Gilman).

There are two other species of *Acridella* in the collection, but I have to leave them unnamed until more South African material of

this genus is available for study. Karny (*l.c.*) recorded *A. variabilis*, Klug, from South West Africa, but the name conveys very little.

Genus THYRIDOTA Uvarov.

1925. *Thyridota*, Uvarov, Ann. Natal Museum, v, p. 160.

Thyridota dispar Uvarov.

South West Africa : Narebis, 1921, 1 ♂, 2 ♀♀ (K. H. Barnard); Kamanyab, March 1925, 2 ♂♂ (Mus. Exped.); Otjiverongo, April 1921, 1 ♂, 1 ♀ (J. S. Brown).

Genus PLATYPTERNODES I. Bolivar.

Platypternodes crevipes (Stål.)

South West Africa : Kamanyab, January 1925, 1 ♂ (Mus. Exped.); Tsintsabis, December 1919, 1 ♂, 1 ♀ (R. W. Tucker); Otjituo, January 1925, 1 ♂ (R. W. Tucker).

Genus DURONIA Stål.

Duronia chloronota Stål.

A series of specimens from various localities.

Genus ORTHOCHTHA Karsch.

Orthochtha dasyncnemis (Gerstaecker).

South West Africa : Gaub, January 1919, 3 ♂♂ (R. Lightfoot).

Genus PARACINEMA Fischer.

Paracinema tricolor (Thunberg).

South West Africa : Nuragas, January 1919, 2 ♀♀ (R. Lightfoot); Waterberg, February 1920, 1 ♂, 2 ♀♀ (R. W. Tucker); Otjituo, January 1920, 1 ♂ (R. W. Tucker).

Genus PSEUDOGMOTHELA Karny.

1910. *Pseudogmothela*, Karny, *l.c.*, p. 79.

1921. *Pachycarus*, Uvarov, Ann. Mag. Nat. Hist. (9), vii, p. 383 (*syn. nov.*).

Karny described his genus on the basis of three very poor specimens without hind legs. He said in the description that the pronotum has

inflexed lateral keels, while in fact the keels are scarcely perceptible at all. A direct comparison of the genotype, *Pseudogmothela rehni*, with the three known species of my genus *Pachycarus* convinced me of the identity of the genera, though *P. rehni* is well distinct specifically from its congeners.

Pseudogmothela rehni Karny.

From the three typical females I select here as the single type that from Lehututu-Kgokong.

By the venation of the elytra, *P. rehni* comes near my *P. media*, known in the male sex only, while no males are known for *P. rehni*. In any case, the two species must be different, since even the female of *P. rehni* has quite long elytra and wings, while even the male of *P. media* is short-winged. Besides, the fastigial foveolae in *P. rehni* are rather of the type observed in *P. pallida* (Kirby) (see my description of it, *l.c.*), and not as narrow as in *P. media*.

Pseudogmothela stauronotus (Uvarov).

1921. *Pachycarus stauronotus*, Uvarov, Ann. Mag. Nat. Hist. (9), vii, p. 385, figs. 2A, 3A.

Kamanyab, South West Africa, 1 ♂.

Genus LEVA I. Bolivar.

Leva angulata (Karny).

(Text-fig. 1.)

1910. *Paragymnbothrus angulatus*, Karny, *l.c.*, p. 80.

Karny's brief original description may be supplemented by the following remarks and a drawing of the type (fig. 1); the latter is an exceedingly poor specimen, having been preserved in alcohol, entirely discoloured and shrunk.

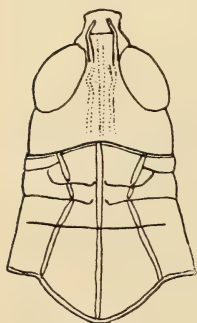


FIG. 1.—*Leva angulata* (Karny), ♀ type.

Frontal ridge convex throughout, broad, scarcely narrowed at the ocellum, the apex not quite acute, separating the fastigial foveolae from each other. The foveolae are vertical, imperfectly margined below, somewhat longer than broad, not narrowed in front. Fastigium of vertex acute, pentagonal, longer than broad. Lateral pronotal keels angulately inflexed, obsolescent between the first and the second sulcus, in metazona somewhat convex. Elytra extending a little beyond the hind knees.

I have examined one female from Walfish Bay, and I select it here as the single type.

Genus PARAGYMNOBOTHRUS Karny.

1910. *Paragymnobothrus*, Karny, *l.c.*, p. 80.

1925. *Homalohippus*, Uvarov, Ann. Natal Museum, v, p. 163 (*syn. nov.*).

Karny in his description of *Paragymnobothrus* laid special stress on the position of the fastigial foveolae, which he stated to be scarcely, or not at all, visible from above. This made me (Ann. Mag. Nat. Hist., ser. 9, ix, p. 539) to regard *Paragymnobothrus* as a synonym of *Leva*, Bol., while I identified South African species of the latter genus with *P. rectus*, Karny. With the types of Karny's two original species, viz. *Paragymnobothrus rectus* and *P. angulatus*, before me now, I see that (1) they are not congeneric; (2) that *P. rectus* is conspecific with my *Homalohippus coerulipes* (see below); (3) that *P. angulatus* is a *Leva*; (4) that the insect identified by me as *Leva recta*, Karny, is an undescribed species of *Leva*. Since I have made a suggestion (*l.c.*) that *P. rectus* should be considered the genotype of *Paragymnobothrus*, while *Homalohippus coerulipes* is the type of its genus, it follows that *Paragymnobothrus*, Karny, has preference over *Homalohippus*.

Paragymnobothrus rectus Karny.

1910. *Paragymnobothrus rectus*, Karny, *l.c.*, p. 80.

1925. *Homalohippus coerulipes*, Uvarov, Ann. Natal Mus., v, p. 164, figs. 5, 6, 8 (*syn. nov.*).

I have examined, apart from the typical series of my species, one male and one female, which are the types of Karny's species, and I select here the male from Lookaneng-Severelela, Kalahari, as the single type.

Genus PROSTETHOPHYMA I. Bolivar.

1909. *Prostethophyma*, I. Bolivar, Bol. Soc. Esp. Hist. Nat., 1909, p. 295.

1910. *Paraduronia*, Karny, *l.c.*, p. 81 (*syn. nov.*).

1914. *Prostethophyma*, I. Bolivar, Trab. Mus. Nac. Cien. Nat., ser. Zool., No. 20, pp. 49, 51.

Bolivar described his genus *Prostethophyma* in 1909 very briefly in a key to the genera of Acridinae (Truxalinae) and without quoting any species under it, and only in 1914 he published a full description

of the genus and of its first species, *P. cephalica*, Bol. In the meantime Karny described *Paraduronia*, which, as I see now from the examination of the type species (see below, *Prostethophyma platypternoides*), does not differ from *Prostethophyma*. It would seem, therefore, that the name *Paraduronia*, Karny, should be used for the genus, but this is a name preoccupied by Bolivar, who, in the same paper of his (*l.c.*, p. 289), used it for an Indian genus with two properly quoted species in it. Thus, the name *Prostethophyma*, Bol. is still the only one available for the genus. Of course, it may be argued that *Prostethophyma*, 1909, became suppressed by *Paraduronia*, Karny, 1910, so that a new name is wanted for the genus, but I am not inclined to accept this ultra-formal point of view.

In addition to the genotype, *Prostethophyma cephalica*, Bol., I have described a species *P. minor*, which turns out to be a synonym of *P. platypternoides*, Karny, and there are two new species in the British Museum collection and one in the South African Museum which I describe below.

Prostethophyma platypternoides (Karny).

1910. *Paraduronia platypternoides*, Karny, *l.c.*, p. 82.

1921. *Prostethophyma minor*, Uvarov, *Ann. Mag. Nat. Hist.* (9), viii, p. 375, fig. 1B (*syn. nov.*).

Karny's type is a little smaller than mine, but otherwise there is no difference between them.

Prostethophyma crassicornis, sp. n.

(Text-fig. 2.)

♂ (*type*). Antennae extending a little beyond the pronotum, strongly incrassate, in the apical part compressed and twisted.

Face strongly oblique. Frontal ridge moderately broad, broadly and deeply sulcate from above the ocellum downwards, in profile slightly concave at the ocellum. Fastigium strongly projecting forward, narrow, oval, distinctly concave; its antero-lateral sloping margins narrow, so that there is no room for the foveolae, which are replaced by a few irregular punctures.

Maxillary palpi with the apical joint dilated, oval, longer than it is broad, with its apex truncate. Labial palpi with the last joint slightly compressed and dilated.

Pronotum rugulose and punctured. Lateral carinae feebly developed

and irregular, parallel in front of the first sulcus, divergent behind it, obsolescent in metazona. Median carina very distinct throughout, linear. The typical sulcus well developed, the other two feeble. Hind angle obtuse, rounded.

Elytra reaching the hind knees, broad. Venation (fig. 2) very like that in *P. cephalica*, Bol. (see Uvarov, *l.c.*, fig. 1A), but the externo-median area narrowed apically, the interradiar area narrower.

Hind femora relatively short and thick. The two inner spurs of hind tibiae not very different in size.

Coloration as in *P. cephalica*. Antennae blackish. Apical joint of maxillary palpi blackish-brown. Pronotum with a broad pale median stripe, included between two irregular blackish lines. Elytra slightly infumate throughout, more distinctly so in the apical part ;



FIG. 2.—*Prostethophyma crassicornis*, sp. n., ♂. . Antenna, palpi, and elytron.

scapular area with a pale yellowish streak in the basal part ; basal portions of radial veins blackish. Wings rather broadly infumate at the apex. Hind femora orange coloured, with three grey spots above ; knees broadly blackened all over ; hind tibiae orange.

Length of body, 16.5 ; pronotum, 4 ; elytra, 13 ; hind femur, 10 mm.

A single male from Kaross, South West Africa, February 1925 (South African Museum).

The structure of the head in this species is very remarkable, since there are no foveolae of the vertex, which are more or less developed in other species of the genus. This is due obviously to the unusual narrowness of the vertex, and there is no reason to suggest that *P. crassicornis* should be removed from the genus. Indeed, *P. platypternoides* has the foveolae only faintly indicated by a series of punctures, and occupies in this respect a position intermediate between other congeners and *P. crassicornis*. Other interesting features of the new species are the structure of antennae and of the maxillary palpi.

Prostethophyma palpalis, sp. n.

(Text-fig. 3.)

♂ (*type*). Of the same size as *P. crassicornis*, but more robust.

Antennae extending well beyond the pronotum, slender, their apical third compressed and twisted. Face moderately reclinate. Frontal ridge unusually broad, finely punctured throughout, slightly sulcate in the lower part. Fastigium moderately projecting forward, broadly oval, feebly concave, with a median carinula. Foveolae well developed, twice as long as broad, slightly curved, punctured.

Maxillary palpi with the apical joint strongly dilated, round,

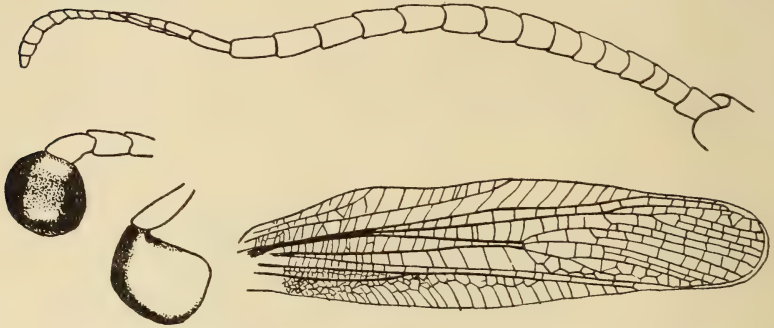


FIG. 3.—*Prostethophyma palpalis*, sp. n., ♂. Antenna, palpi, and elytron.

broader than long. Apical joint of the labial palpi still more strongly expanded (fig. 3).

Pronotum moderately rugulose. Lateral carinae feeble, irregular, in front of the first sulcus slightly convergent, between the sulci slightly divergent, in metazona distinctly divergent and feebly convex. Median carina well distinct, linear. All transverse sulci feeble. Hind angle obtuse.

Elytra (fig. 3) scarcely extending beyond the hind knees. Venation rather similar to that in *P. platypternoides* (see Uvarov, *l.c.*, fig. 1B, *P. minor*), but the scapular area is broader and interradiar area narrower.

Coloration brownish. Antennae pale testaceous, but blackened apically. The expanded apical joints of both palpi ivory white marked with black. Lateral pronotal lobes with a pale longitudinal streak below the middle. Elytra not infumate, except at the apex and there only slightly, but with 2-3 indefinite darkish spots

before the apex ; radial veins brown. Wings with the apex infumate. Hind femora of the general colour, with indefinite spots above ; knees blackish only on the sides. Hind tibiae reddish.

♀ (*paratype*). Head thick. Antennae shorter than head and pronotum together, filiform, with blackish apices. Apical joints of palpi slightly dilated. Head and pronotum above with a pale median stripe.

Length of body, ♂ 16, ♀ 21 ; pronotum, ♂ 4, ♀ 4.5 ; elytra, ♂ 13, ♀ 14.5 ; hind femur, ♂ 10.5, ♀ 12 mm.

Three males and one female taken at Harrismith, Orange Free State, Feb. 1927 (R. E. Turner ; British Museum).

The structure both of palpi and antennae in this species is very striking, though both these characters represent only a further development of the specialisation of those organs observed in *P. crassicornis*.

Prostethophyma bechuana, sp. n.

(Text-fig. 4.)

♂ (*type*). Antennae filiform, straight, extending well beyond the pronotum.

Face moderately oblique, coarsely punctured. Frontal ridge fairly broad, parallel-sided, shallowly excavate in the region of the ocellum, coarsely punctured. Fastigium of vertex projecting well forward,

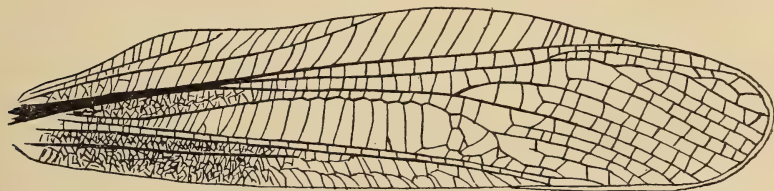


FIG. 4.—*Prostethophyma bechuana*, sp. n., ♂. Elytron.

considerably longer than broad, antero-lateral margins almost straight, forming an acute, scarcely rounded, apical angle ; the surface feebly concave, with a distinct, though irregular, median carinula which extends on to the occiput. The latter with transverse rugosities on both sides of the carinula. Foveolae of vertex not developed, but their spaces fairly broad and punctured.

Maxillary and labial palpi with all joints normal, not dilated.

Pronotum densely, but not coarsely, punctured all over. Lateral carinae developed only in the prozona, where they are rounded-

inflexed ; in the metazona they are represented only by a pair of elongate tubercles immediately behind the typical sulcus, and are obsolete in the rest. Median carina well distinct, linear. The first two transverse sulci obsolete, the typical sulcus feeble, but distinct. Hind margin not broadly rounded.

Elytra extending beyond hind knees. Venation (fig. 4) similar to that in *P. cephalica*, but the radial veins are practically straight and the discoidal area narrow.

The two inner spurs of the hind tibiae differ in length.

Coloration uniformly black, only in places fading into brownish-black. Antennae brown. Elytra strongly and uniformly infumate. Wings bluish at the anal margin, strongly infumate in the rest.

♀ (*paratype*). Brownish-black ; hind femora with a testaceous pre-apical ring, and on the inside of the upper surface with two testaceous spots.

Length of body, ♂ 20, ♀ 24.5 ; pronotum, ♂ 4.5, ♀ 6 ; elytra, ♂ 15.5, ♀ 19 ; hind femur, ♂ 11.5, ♀ 14 mm.

One male and three females taken at Ghanzi, Mongalatsila, Bechuanaland, January 29 to March 12, 1925 (J. Maurice ; British Museum).

The uniform black coloration of this insect may be not a specific character ; similar charcoal-black forms are known for many African grasshoppers, especially in areas where the grass has been recently burnt.

Genus *AIOLOPUS* Fieber.

Aiolopus thalassinus (Fabricius) ?

A series of specimens from several localities.

I am not at all convinced that the range of the European *A. thalassinus* is really as wide as the existing records make it. It seems more reasonable to suggest that several species are confused at present under the name, but the question cannot be settled without a thorough revision of the genus. In the meantime, I cannot be certain of the identification of the South West African specimens.

SUBFAMILY OEDIPODINAE.

Genus *HUMBE* I. Bolivar.

Humbe tenuicornis (Schaum).

South West Africa : Tsumeb, January 1920, 1 ♂ (E. Kochig) ; December 1919, 1 ♀ (R. W. Tucker) ; Outjo, January 1925, 1 ♀ (Mus.

Exped.); Windhoek, 1919, 1 ♀; Gaub, January 1919, 1 ♀ (R. Light-foot).

Genus OEDALEUS Fieber.

Oedaleus nigrofasciatus (De Geer).

1773. *Acrydium nigrofasciatum*, De Geer, Mem. Ins., iii., p. 493 (nec auct.!).

1884. *Oedaleus nigrofasciatus* var. *gracilis*, Saussure, Prodr. Oedip., p. 116.

1922. *Oedaleus gracilis*, Uvarov, Ann. Mag. Nat. Hist. (9), ix, p. 102.

South West Africa: Gaub, Dec. 1919, 2 ♂♂ (R. W. Tucker); Tsumeb, January 1920, 1 ♂, 1 ♀ (F. Kochig); Okahandja, 19-29, iii, 1928, 1 ♀ (R. E. Turner; British Museum).

The correct interpretation of De Geer's species has been given by me in a discussion of synonymy of the Mediterranean *Oedaleus decorus*, Germ. (Novitates Zoologicae, xxx, 1923, p. 69).

Genus PYCNODICTYA Stål.

Pycnodictya herero Karny.

(Plate II, fig. 1.)

Tsumeb, December 1919, 1 ♀ (R. W. Tucker).

A very striking insect, of which I thought it useful to give a coloured figure, since the identification of species in this genus depends to a large extent on the coloration, especially of the hind wings and legs.

The specimen figured has been compared by me with the type, and agrees with it in all essential characters, though differing in the general colour of the head, pronotum, and elytra, which cannot be considered of importance.

From the two cotypes, on which the species has been originally described, I select here the female from Okahandja as the single type; the other female is badly discoloured.

Genus SCINTHARISTA Saussure.

Scintharista magnifica Uvarov.

1922. *Scintharista magnifica*, Uvarov, Ann. Mag. Nat. Hist. (9), ix, p. 105.

Okahandja, 13-19, i, 1928, 6 ♀♀ (R. E. Turner; British Museum); Zesfontein, February 1925, 1 ♂; Kamanyab, March 1925, 1 ♂, 1 ♀

(Mus. Exped.); Usakos, February 1920, 1 ♂ (R. W. Tucker); Windhoek, November 1920, 2 ♀♀ (S. Gilman).

Genus ACROTYLUS Fieber.

Acrotylus diana Karny.

N. Bechuanaland: Ghanzi, Mongalatsila, 3, xii, 1924, 1 ♀ (J. Maurice; British Museum); Ovamboland: Ondongua, 1 ♀, Mafa, 1 ♂, 1921 (K. H. Barnard; South African Museum).

A female from the typical series labelled Windhoek is selected here as the single type of the species.

Acrotylus patruelis (Herrich-Schaeffer).

Numerous specimens from various localities.

I am not quite convinced that South African specimens usually identified as *A. patruelis* are really that European species. Indeed, there seem to be more than one species of this group in Africa, specimens from different regions being somewhat distinct in the length of antennae, shape of the frontal ridge, etc. A thorough revision of the group would be most desirable.

Karny recorded also *A. humbertianus*, Saussure, from South West Africa, but two specimens named so by him are before me now and they are only badly discoloured examples of *A. patruelis*. I am almost certain that *A. humbertianus*, a species of India and Ceylon, does not occur in Africa, at least not in South Africa.

Genus SPHINGONOTUS Fieber.

Sphingonotus scabriculus Stål.

South West Africa: Okahandja, January 20 to February 23, 1928, 2 ♂♂, 2 ♀♀ (R. E. Turner; British Museum); Kamanyab, January 1925, 1 ♀; Outjo, January 1925, 2 ♀♀; Choabendus, January 1926, 1 ♀; Hoarusib (Otshu), March 1926, 1 ♀ (Mus. Exped.); Kalkfontein, February 1923, 2 ♂♂ (J. S. Brown); Omaruru, 1921, 1 ♀ (J. S. Brown); Namutoni, 1921, 1 ♂ (K. H. Barnard).

SPHINGONOTUS LOBULATUS Karny.

1910. *Sphingonotus scabriculus* var. *lobulatus*, Karny, l.c., p. 75.

Karny described this insect very briefly, separating it from *S.*

scabriculus only by the hyaline, non-fasciated hind wings. The type before me (a female from Windhoek, selected here as the single type) is in a very poor state of preservation, having been preserved in some liquid before it was pinned, and the shape and sculpturing of the head and pronotum are considerably distorted. Nevertheless, the shape of the lateral pronotal lobes is very different from that in *S. scabriculus*, their anterior lower angle forming a rounded lobe projecting forwards and downwards and the lower margin being, in consequence, sinuate and more oblique than in *S. scabriculus*. Hind margin of the pronotal disc is in this insect less lobate than in *S. scabriculus* and its hind angle more acute.

It is difficult to decide whether these characters, and the absence of the wing fascia, are sufficiently constant to be of specific value, but I prefer to consider *S. scabriculus* and *S. lobulatus* distinct specifically, at least tentatively.

Genus *XENOTETTIX* Uvarov.

1925. *Xenotettix*, Uvarov, Ann. Natal Museum, v, p. 170.

Xenotettix calcarata, Uvarov.

South West Africa : Kubib, January 5, 1916, 1 ♂ (R. W. Tucker).

I have described this interesting grasshopper (*l.c.*, p. 175, figs. 13-17) from a single female taken 36 miles east of Port Nolloth, and the male has not been known hitherto. It agrees in all essential characters with the female, but is very much smaller, the measurements being as follows :—

Length of body, 11·5 ; pronotum, 2·5 ; elytra, 10 ; hind femur, 7·5 mm.

Genus *MICROTMETHIS* Karny.

Microtmethis kuthyi Karny.

(Text-fig. 5.)

South West Africa : 1 ♀ ; Luderitzbucht, 1909, 1 ♀ (R. Marloth).

Karny described this remarkable insect from the male sex only ; I have before me two females which obviously belong to the same species, though differing greatly in size.

The genus is allied to *Brainia* Uv. (Ann. Mag. Nat. Hist., ser. 9, ix, 1922, p. 103), differing from it in the shape and venation of the elytra, in the expanded and reflexed hind angles of lateral pronotal lobes, and in the strongly flattened, scarcely margined, frontal ridge.

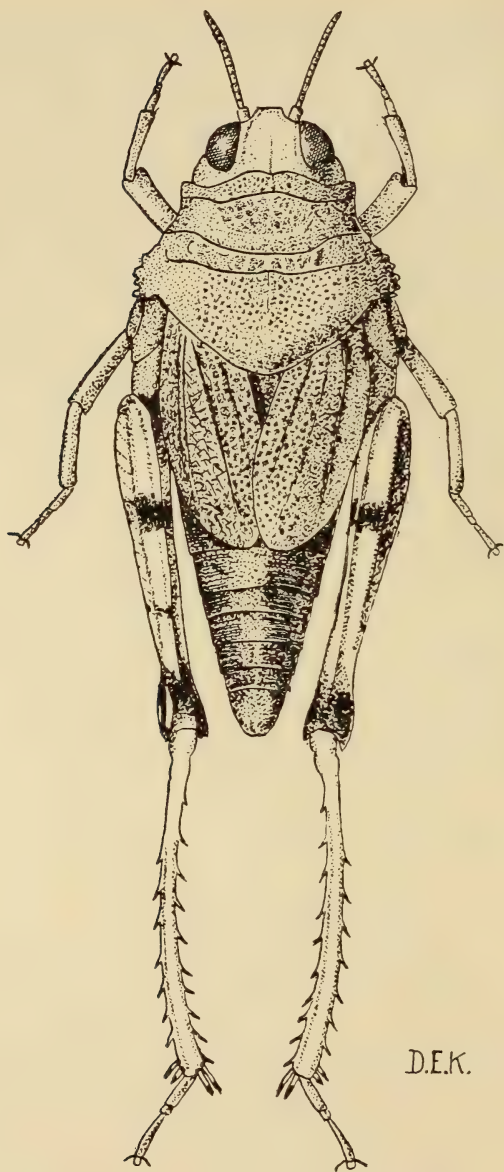


FIG. 5.—*Microtmethis kuthyi*, Karny, ♀.

Anterior margin of the prosternum in *Microtmethis* is distinctly reflexed, collar-like. Hind angles of the lateral pronotal lobes in the female of *M. kuthyi* are more expanded than in the male and much more strongly crenate. Frontal ridge in the three cotypic males before me is better pronounced than in the females, but this is apparently due to the fact that the males shrunk after being preserved in alcohol. Wings in the female sex are only about half the length of the elytra. Other characters of the insect may be seen from the figure.

The measurements of the female of *M. kuthyi* are as follows: Length of body, 25; pronotum, 8; elytra, 10; hind femur, 14 mm.

I select here one of the males from Luderitzbucht as the single type of *M. kuthyi*.

Genus LITHIDIUM Uvarov.

1925. *Lithidium*, Uvarov, Ann. Natal Museum, v, p. 177.

Lithidium pusillum Uvarov.

1925. *Lithidium pusillum*, Uvarov, l.c., p. 178, figs. 18, 19, 20.

South West Africa: Luderitzbucht, 1 ♀, 1 larva; no exact locality, 1 ♀; Otjimbingue, 1 larva (Berlin Museum).

The four specimens recorded are cotypes of *Pseudobufonacris mendax*, Karny, under which name the author confused representatives of two genera, viz. *Lithidium* and *Eneremius*, Saussure (see below, p. 57).

The two adult females do not differ in any essential characters from the two original ones described by me. The male of this curious insect still remains unknown; it must be a very minute creature.

Lithidium rubripes sp. n.

(Text-fig. 6.)

♀ (*type*). A little larger than the genotype, and differing from it in the structure of the head, sculpture of the body, and coloured hind legs.

Antennae about as long as head and pronotum together. Face densely punctured; frontal ridge particularly so. Fastigium of vertex evenly punctured all over, without sulci or ridges of any kind, not at all separated from the frontal ridge or from the occiput.

Pronotum shallowly punctured, scarcely rugulose. Two of the transverse sulci distinct, joined in the middle. Median keel represented only by a very fine smooth line; lateral keels indicated in the prozona

by two small, smooth, very low tubercles. Hind margin of the disc less deeply festooned than in the genotype. Prosternum with the front margin broadly prominent and rounded-excised. Mesonotum

and metanotum smooth, with fairly large, but shallow and not dense, punctures.

Abdomen more densely punctured than metanotum, but not rugulose; each tergite with a minute round tubercle at the middle of the hind margin and one (or two) slightly larger round tubercles on the sides.

Hind femora very thick and broad, covered with long hairs; upper carina denticulate; lower outer area broad, almost paralle-sided, flat. Hind tibiae with 6 outer and 7 (apart from the apical) inner spines.

Coloration whitish-ochraceous. Antennae with some blackish rings. Front and middle legs with black dots. Hind femora with black dots along the lower outer carina and on the knees, with a blackish pre-apical transverse spot above; the inner side slightly reddish. Hind tibiae red; their spines black-tipped. Median tubercles of abdominal tergites and densely placed dots

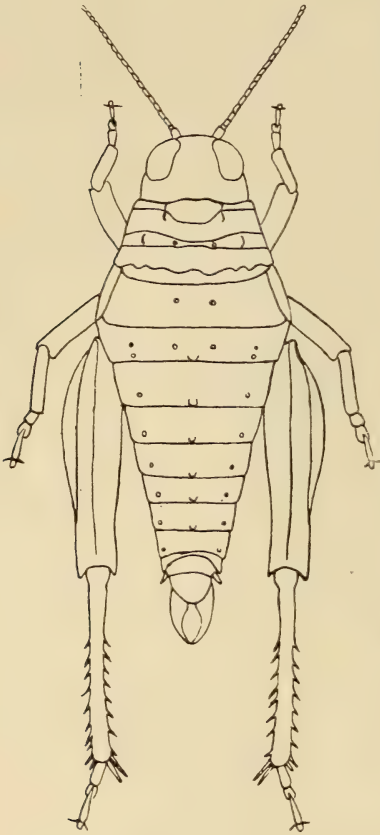


FIG. 6.—*Lithidium rubripes*, sp. n., ♀.

on the apical tergites, black.

Total length, 18; pronotum, 3.5; metanotum, 2.5; width of body at the metanotum, 7; length of hind femur, 8.5; width of hind femur, 3.5 mm.

The type is from Haris, South West Africa, 9, i, 1916 (R. W. Tucker); a paratypic female is labelled simply Br. South West Africa (R. W. Tucker). The type is in the British Museum, the paratype in the South African Museum.

The paratype differs from the type only in its darker general

coloration, hind tibiae being bright red and the under side of the abdomen also red.

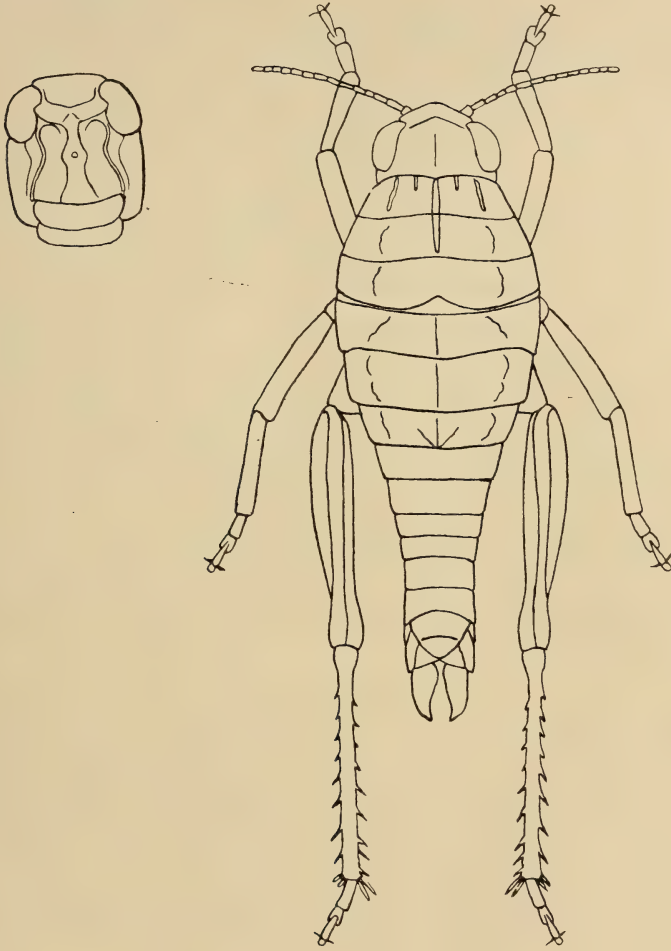


FIG. 7.—*Eneremius mendax* (Karny), ♀.

Genus *ENEREMIUS* Saussure.

1888. *Eneremius*, Saussure, Addit. ad Prodr. Oedip., p. 160.

1910. *Pseudobufonacris*, Karny, l.c., p. 76 (*syn. nov.*).

A study of the original series of *Pseudobufonacris mendax*, Karny, revealed the fact that it includes representatives of two genera, one of them being my *Lithidium* (see above), i.e. a member of *Thrincini*,

while two specimens belong to a genus of *Tmethini*, and I was unable to find in them any characters separating them from *Eneremius* of Saussure. Since one of these two specimens is selected by me as the type of *Pseudobufonacris mendax*, Karny's genus falls as a synonym of *Eneremius*, Saussure.

Eneremius mendax (Karny).

(Text-fig. 7.)

1910. *Pseudobufonacris mendax*, Karny, l.c., p. 77 (partim!).

As I have just mentioned, the original series of *Pseudobufonacris mendax* includes two insects which are very distinct, though similar superficially. Two adult females, taken at Warmbad, belong to *Eneremius*; one of them is designated here as the single type of *P. mendax*; it agrees best of all with the original measurements. Two other adult females belong to my *Lithidium pusillum* (see above), while two larvae, one from Luderitzbucht, another from Otjinbingwe, also probably belong to the last-named species, or, at any rate, the genus.

It is not impossible that *E. mendax* does not even differ specifically from *E. mutus*, Saussure, but the latter is known to me by its description only, and a direct comparison of the types would be necessary to establish the synonymy.

Bufotettix, gen. nov.

Allied to *Crypsicerus* Sauss., differing from it in the antennae exceeding the vertex; in the frontal ridge with well-raised margins; in the vertex forming a very obtuse, rounded angle with the frons; and in the presence of a small apical spine on the inner side of hind tibiae.

I hope to publish a re-description of *Crypsicerus* Sauss. at a later date after the unique type of *C. cubicus* Sauss., which belongs to South African Museum and is before me now.

Bufotettix rubridens, sp. n.

(Plate II, fig. 2; text-figs. 8 and 9.)

♂ (*type*). Antennae 13-jointed, stout, rounded, short, but surpassing the vertex considerably when turned upwards. Head very large. Face sloping forward, very broad, with shiny callous tubercles. Frontal ridge with the margins regular above the ocellum and re-

presented by series of tubercles below it ; it is constricted at the fastigium, elongate-oval in the upper part, strongly constricted again below the antennae, divergent towards the clypeus. Antennal sulci moderately deep, converging upwards, but remaining broadly separated by the frontal ridge. Foveolae of vertex fully frontal, elongate-trapezoidal, with irregular callous margins. Vertex strongly transverse, slightly sloping, forming an obtuse angle with the face ; its front margin straight, raised, interrupted in the middle and depressed near the lateral angles ; its surface transversely impressed. Top of the head with rounded shiny tubercles ; behind the eyes some radial callous ridges. Cheeks obtusely granose. Clypeus very large and broad. Mandibles very large, with strong teeth. Occiput strongly convex.

Pronotum smaller than the head, decidedly transverse, with the anterior margin slightly concave and the posterior broadly and regularly rounded ; the surface slightly concave, covered by numerous tubercles. Lateral keels well distinct, though irregular, deeply cut by the typical sulcus, which is distinct on the disc but obsolescent in its middle. There is no median carina, only a slightly depressed median line free of tubercles. Hind margin thick and bearing a series of subacute tubercles placed at regular intervals. Lateral lobes concave, smooth in prozona, tuberculate in metazona, trapezoidal in shape, deeper than long ; the typical sulcus very deep ; anterior lower angle slightly more than 90° ; lower margin feebly sinuate ; posterior angle obtuse.

Prosternum with the front margin expanded and forming a strongly transverse trapezoidal plate.

Mesonotum short, minutely granose. Metanotum with a smooth subtriangular plate in the middle, a median and a pair of sublateral round tubercles on the hind margin. Pleurae tuberculate.

Abdomen strongly conical, with the apex recurved. Each tergite bears a median and a pair of sublateral tubercles on the hind margin.

Supra-anal plate elongate-triangular. Cerci very short, irregularly oval, not longer than broad. Subgenital plate recurved, obtusely conical.

Hind femora broad and short. Upper carina almost straight, suddenly lowered before the knees ; lower carina more expanded than the upper, broadly convex. The outer side of both carinae bearing low round tubercles ; the outer median area convex, irregularly ridged, and imperfectly separated from the upper outer area. Hind tibiae

armed with 6 outer and 7 inner spines ; there is also on the inner side a small apical spine.

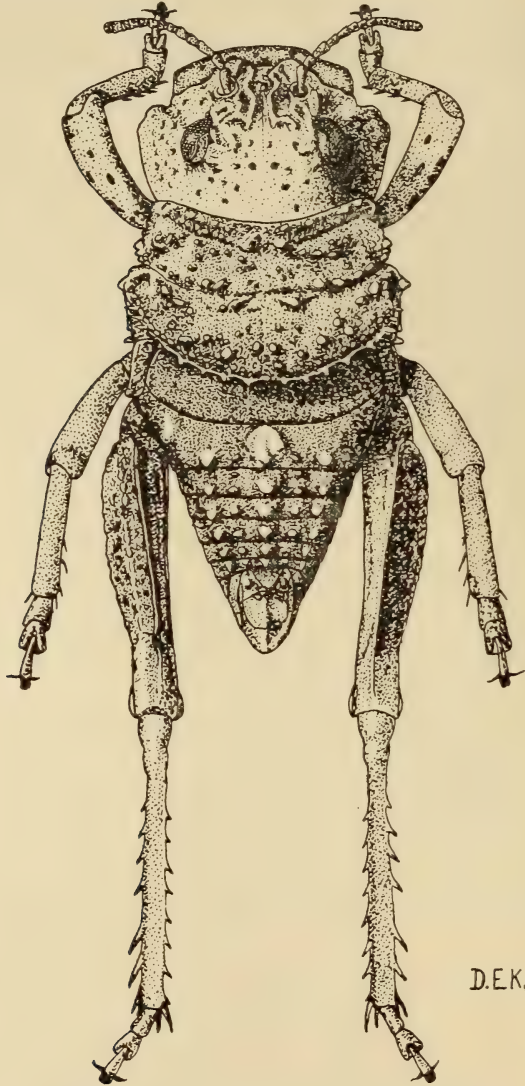


FIG. 8.—*Bufotettix rubridens*, g. et sp. n., ♂

General coloration pale testaceous. Antennae blackish, except basally. Antennal furrows purple. Mandibles of brilliant sealing-wax-red, margined with black. Lower inner sulcus of hind femora

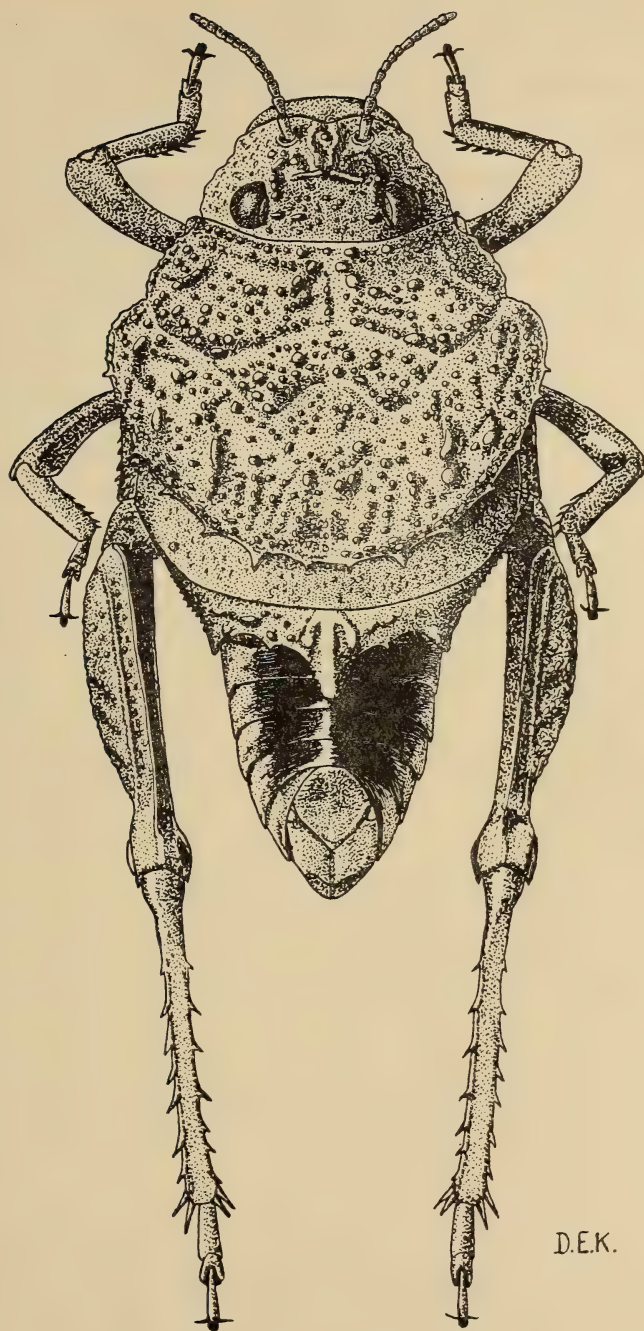


FIG. 9.—*Bufotettix rubridens*, g. et sp. n., ♀.

pale cinnabar red. Hind tibiae wax-yellow ; their spines with black tips.

♀ (*paratype*). Somewhat larger than the male and very different from it in general appearance, owing to the relatively smaller head and the very strongly dilated pronotum, mesonotum, and metanotum.

Face narrower than in the male, with numerous round tubercles. Frontal ridge with the margins irregular even above the ocellum. Vertex forming a very obtuse angle with the face ; occiput not convex, concealed under pronotum.

Pronotum extremely broad, transverse. The surface very feebly selliform, covered with numerous tubercles partly arranged in series. Hind margin semicircular, armed with conical tubercles.

Mesonotum very broad, convex, almost smooth. Metanotum also strongly expanded, with an obtuse median carina ending with an acute median projection ; there are on the hind margin two shorter lateral projections and some small tubercles ; the surface of the metanotum uneven and with tubercles.

Abdomen relatively small, conical, with a median and two lateral series of tubercles.

Valves of the ovipositor short and very stout, excavate and indented near the apices.

Length of body, ♂ 30, ♀ 36 ; pronotum, ♂ 8.5, ♀ 15 ; maximum width of pronotum, ♂ 15, ♀ 20 ; hind femur, ♂ 16.5, ♀ 19 mm.

South West Africa : Karibib, March 1923, 6 ♂♂ (including the type which, together with some of the paratypes, is labelled simply "Karibib, South West Africa"), 7 ♀♀ (Mus. Exped.).

This extraordinary insect is particularly remarkable for the abnormal development of the head in the male and of the pronotum in the female, the male reminding one strongly of wingless *Stenopelmatis* occurring in the same regions of Africa. The mandibles are equally well developed and brilliant red in both sexes, but the red colour becomes invisible when the mandibles are closed, as they normally are. It would be useless to speculate on the biological significance of the coloration of mandibles, since nothing is known about the habits of these insects, which probably belong to the true desert fauna.

I have before me also a series of very small larvae (first and second stage) of the same species collected at Outjo in January ; it may be judged from the data that larvae hatch in January and the adult stage is reached in March.

I suspected this insect to be identical with *Crypsicerus cubicus*

Saussure, which has been described from a single female, but there are some differences between Saussure's species and our specimens, which cannot be specific only. Thus, in *C. cubicus* the vertex forms a right angle with the face, while in *B. rubridens* the angle is very obtuse, particularly in the female. Antennal furrows, which are purple in my species, are black in the other, but this is a specific character, though the length of antennae is generic. The description of the shape of pronotum given by Saussure is not very lucid, but in *B. rubridens* the pronotum is certainly not "rhomboidale"; hind margin in Saussure's species is said to be "latiuscule truncatus, subarcuatim incisus," which description does not fit our insect at all. Hind tibiae in *C. cubicus* are armed with 5 inner and 6 outer spines, there being no apical spine on both sides; in *B. rubridens* there are 6 inner and 7 outer spines, as well as a small, but distinct, apical spine on the inner side. The presence of the latter spine, and the structure of the frons, vertex, and antennae, excludes my species from the genus *Crypsicerus*, according to Saussure's key to genera, although I am not inclined to attach too much importance to the spine; in any case, the genus *Lathicerus*, in which the spine is present, is widely different from *Crypsicerus* in the structure of the sternum.

The larvae of *B. rubridens*, even in the first stage, possess all these characters separating them from *C. cubicus*.

SUBFAMILY PAMPHAGINAE.

Genus CHARILAUS Stål.

Charilaus monomorphus, sp. n.

(Text-fig. 10.)

1876. *Charilaus carinatus*, Stål (*partim*!), Öfver. K. Vet.-Akad. Förh., 1876, No. 3, p. 35, ♀ (*nec* ♂!).

Differs from all known species by the elytra being rudimentary and the pronotum truncate in both sexes.

♂ (*type*). Antennae considerably longer than head and pronotum together, compressed, but little dilated, basally.

Head acutely conical, as long as the pronotum. Face strongly oblique, slightly concave in profile, finely rugulose. Frontal ridge above the ocellum compressed and finely sulcate, below the ocellum

gradually widened downwards with the margins little raised and the surface scarcely impressed, rugulose. Lateral facial keels fine, straight. Cheeks with fine transverse rugosities. Fastigium of vertex longer than at the base wide, parabolic in shape; the apex with a narrow, closed slit; the surface of the fastigium slightly concave, finely rugulose; the two parallel carinae distinct, though not sharp, becoming irregular on the occiput; median carinula scarcely perceptible.

Pronotum with the surface rugulose and granulose. The paired median carinae gradually convergent backwards. Lateral carinae developed between the front margin and the first sulcus, slightly incurved and convergent backwards; lateral carinae of the metazona are sharp, much more distant from each other than those of the prozona, feebly convergent backwards, while in front of the typical sulcus their prolongation is formed by oblique supplementary carinae of the lateral lobes. Both the front and the hind margin of the pronotal disc are broadly rounded-truncate. Only the typical sulcus developed on the disc and cutting all three keels. Metazona trapezoidal, equal in length to about three-fourths of the prozona; the width at the hind margin a little greater than the length. Lateral lobes much longer than deep; front margin oblique, feebly sinuate; lower margin practically straight; hind margin strongly rounded-excised in the lower half, straight and very oblique above; front angle obtuse, hind angle subacute; surface uneven and with round tubercles; the space between the lateral keels and the supplementary oblique keels of the prozona smooth, longitudinally depressed, the depression being obtusely triangular in cross-section; there are two deep sulci, the typical one and one in front of it cutting the supplementary keels.

(Prosternum deformed by the pin.) Mesosternal lobes well separated. The piece between the metasternal lobes circular.

Mesonotum, metanotum, and abdomen with an acute median carina. Elytra elongate-oval, lateral, not reaching the middle of the first tergite, with strongly prominent veins and veinlets.

Abdomen with the apex slightly recurved. Last tergite with a very large trapezoidal emargination, so that only its sides remain and the supra-anal plate appears to follow the tergite before the last. Supra-anal plate large and consisting of two pieces; the basal piece is trapezoidal with broadly rounded apex and occupies the place of the cut-out portion of the last tergite; the apical piece is elongate-triangular, with feebly convex sides and acute apex. Cerci very

small, conical. Subgenital plate short, round, with the apex truncate and slightly emarginate.

Coloration pale green. Antennae purplish-brown, purplish-red basally. Frontal ridge in its lower portion and broad but indefinite postocular fasciae, whitish; each of the fasciae includes a yellowish callous stripe; cheeks with an oblique yellowish-green stripe; vertex and occiput with brown stripes along the outer edge of the median keels. Pronotum with the following portions brown or brownish: median keels and their interspace in the metazona; depressed space

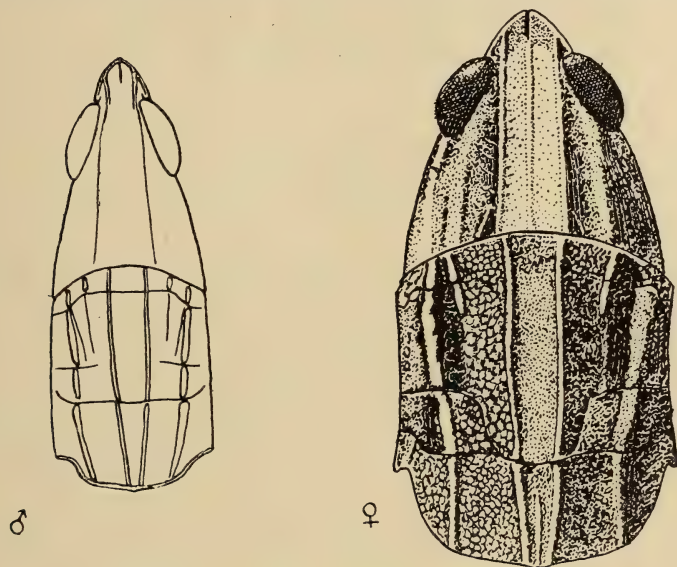


FIG. 10.—*Charilaus monomorphus*, sp. n., ♂ and ♀.

between the lateral keels and the supplementary keels in the prozona; the space between the two sulci of the lateral lobes; and the lower portion of the prozona of the lobes, except the front lower angle. Mesopleurae brown. Elytra chocolate-brown, with the costal margin, radial veins, and the anal margin paler. Abdomen with indistinct darkish lateral fasciae. Lower sulcus of the hind femora pale sealing-wax-red. Hind tibiae purple; their spines very pale testaceous with black tips.

♀ (*paratype*). Considerably larger and more stout than the male. Fastigium of vertex transverse, with the apex obtuse. Head only as long as the prozona of pronotum. Metazona of pronotum about half the length of the prozona; its width at the hind margin more

than one and a half times the length; surface of the pronotum generally more coarsely sculptured, with more developed keels; front and hind margin as in the male. Elytra perfectly lateral, narrow, not reaching the hind margin of the metanotum. Last tergite cut out as in the male; supra-anal plate also similar, but the apical portion is a short equilateral triangle. Upper valves of the ovipositor broad and short; lower valves very small. General coloration brown, with dark brown and blackish pattern as in the male. Abdomen with black lateral fasciae, including small round reddish-testaceous dots placed in a row. Lower sulcus of the hind femora reddish on the inner edge, reddish-brown in the rest; hind tibiae brownish.

Length of body, ♂ 25, ♀ 35; head, ♂ 6, ♀ 6; pronotum, ♂ 6, ♀ 9.5; elytra, ♂ 4, ♀ 4.5; hind femur, ♂ 13, ♀ 16 mm.

South West Africa: Ondongua, Ovamboland, February 1921, 1 ♂ (K. H. Barnard); Tsumeb, December 1919, 1 ♀, 1 larva ♀ (R. W. Tucker).

Stål described his *Charilaus carinatus* originally from a male from the Transvaal (Observ. Orthopt., i, 1875, p. 26), but subsequently (1876) he referred to the same species a female from Damaraland; the two insects differed strongly in the development of the organs of flight and in the shape of the hind pronotal margin, but Stål apparently believed these to be sexual characters. Bolivar (An. Soc. Esp. Hist. Nat., xiii, p. 487) questioned Stål's view, and so did Karsch (Stett. Ent. Zeit., 1896, p. 274), but Saussure (Abh. Senkenberg. Ges., xxi, p. 654) supported Stål's idea on the ground that the hind margin of pronotum may vary in correlation with the development of wings. None of the authors, however, knew both sexes of undoubtedly the same species, since Karny (*l.c.*, p. 58) suspected, in my opinion with full reason, that the types (♂ and ♀) of Saussure's *Ch. brunneri* were not conspecific. On the other hand, Karny described *Ch. curvicollis* from two sexes and they were similar, and the same can be said about my new species.

Bolivar in a later paper (Gen. Insect., Fasc. 170, 1916, p. 7) changed his views, and separated into a special genus *Cephalacris* Bol. the species in which the two sexes are similar, leaving in *Charilaus* only the supposedly dimorphic ones, *i.e.* *Ch. carinatus* St. and *Ch. brunneri* Sauss., in both of which, as we have seen, the association of the sexes appears very doubtful.

My own opinion is that there is no reason to accept Stål's and Saussure's views on the existence of a strong sexual dimorphism in

Charilaus; consequently, there is no ground to retain *Cephalacris* as a distinct genus. I abstain, however, from entering into generic and specific synonymy of the group, hoping to be able to do it later with a larger material and after a re-examination of the types of described species.

SUBFAMILY PYRGOMORPHINAE.

Genus CHROTOGONUS Serville.

Chrotogonus distanti Kirby.

Amatonga Land, January 1889, 1 ♀ (J. de Coster).

Genus MAPHYTEUS I. Bolivar.

Maphyteus baccatus (Stål).

South West Africa: Windhoek, 1919, 1 ♀; Gaub, January 1919, 1 ♂ (R. Lightfoot).

Genus PHYMATEUS Thunberg.

Phymateus viridipes Stål.

South West Africa: Windhoek, 1919, 1 ♂; Tsumeb, December 1919, 2 ♂♂ (R. W. Tucker).

Genus ZONOCERUS Stål.

Zonocerus elegans (Thunberg).

A series of specimens from various localities.

Genus PYRGOMORPHA Serville.

Pyrgomorpha granulata Stål.

1875. *Pyrgomorpha granulata*, Stål, Bih. Sven. Akad. Handl., iii (14), p. 26.

1901. *Pyrgomorpha sanderi*, Krauss, Verh. zool.-bot. ges. Wien, li, p. 287 (*syn. nov.*).

1904. *Tanita sanderi*, I. Bolivar, Bol. Soc. Esp. Hist. Nat., iv, pp. 447, 449.

South West Africa: Okahandja, December 12, 1927 to March 1, 1928, 5 ♂♂ (R. E. Turner; British Museum); Hoarusib (Otshu), March 1926, 1 ♀ (Mus. Exped.); Nuragas, January 1919, 2 ♂♂, 1 ♀

(R. Lightfoot); Tsumeb, 1922, 1 ♀ (E. Kochig); Waterberg, February 1920, 1 ♂ (R. W. Tucker).

I have carefully compared a co-type of *P. granulata* St. with the description of *P. sanderi* Kr. and could find no characters to justify regarding the latter as an independent species. The reason for Krauss doing so was, no doubt, that he did not know the true *P. granulata*, and compared his type of *P. sanderi* with a species from Senegal identified by him as *granulata*, but actually well distinct from it and described by me (Trans. Ent. Soc. London [1925], 1926, p. 440) under the name *P. kruassi* Uv.

The species clearly does not belong to the genus *Tanita* where I. Bolivar included it in his monograph (*l.c.*).

The sculpture of the head and pronotum, *i.e.* their puncturation and granulation, vary considerably in the series studied by me, but the variations are clearly individual.

SUBFAMILY CATANTOPINAE.

Genus MESOPSIS I. Bolivar.

Mesopsis hessei, sp. n.

(Text-fig. 11.)

Allied to the West African *M. abbreviatus* (Pal. Beauv.), but differing from it in the structure of the vertex and in the relatively much shorter male subgenital plate.

♂ (*type*). Antennae nearly twice as long as head and pronotum together; joints 3-7 flattened and expanded, 8th depressed but rounded, the rest cylindrical.

Frontal ridge parallel-sided and shallowly sulcate, at the fastigium strongly compressed and deeply and narrowly sulcate, below the ocellum obsolescent. Fastigium of vertex equal in length to the pronotum, well convex throughout, the margins not at all reflexed and distinctly converging towards the apex which is parabolic in shape. Median carina of the head well raised throughout, becoming obsolete only on the occiput. Lateral foveolae of the vertex extending a little beyond the middle of the fastigium, imperfectly margined near the apex. Lateral facial keels obtuse.

Pronotum rounded and shallowly punctured above. Median carina low, but distinct throughout. Lower margin of the lateral lobes shallowly excavate about the middle. Hind margin of the disc well rounded.

Elytra extending well beyond the hind knees, but not covering the whole of the abdomen.

Cerci scarcely longer than the supra-anal plate. Subgenital plate only somewhat longer than the head, straight in profile, not strongly pointed apically.

General coloration pale greenish. Antennae brownish. A silvery-white stripe runs behind the eyes, along the lower margins of the pronotal lobes of the pleurae and the outer face of the hind femora. Hind wings infumate in more than the basal half. Upper margin of the subgenital plate black.

♀ (*paratype*). Vertex thick; its lateral foveolae extending well beyond the middle. Lateral facial keels almost obsolete. Wings infumate only in the basal third.

Length of body, ♂ 57, ♀ 60; head, ♂ 10, ♀ 13; pronotum, ♂ 5.5, ♀ 7.5; elytra, ♂ 28, ♀ 28; hind femur, ♂ 15, ♀ 21; subgenital plate, ♂ 11.5 mm.

South West Africa: Otjituo, January 1920, 2 ♂♂ (one of them the type), 2 ♀♀ (R. W. Tucker); Tsumeb, December 1919, 1 ♂, 1 larva ♀ (R. W. Tucker); Waterberg, February 1920, 1 ♀ (R. W. Tucker); Nuragas, January 1920, 1 ♂ (R. W. Tucker).

In all known species of the genus the lateral margins of the fastigium are decidedly dilated and reflexed; least of all is this character developed in *M. abbreviatus*, but the new species is remarkable for the still greater reduction of the margins, the whole fastigium being rather stout and distinctly narrowed forward. The much shorter subgenital plate of the male supplies another character differentiating *M. hessei* from *M. abbreviatus*, in which latter the plate is nearly as long as the head and pronotum together.

I dedicate this species to Dr. A. J. Hesse, of the South African Museum.

Genus SHELFORDITES Karny.

Shelfordites aberrans Karny.

(Text-fig. 12.)

I have now studied the type of this curious insect and it proves to be undoubtedly congeneric with *Shelfordites nanus* m., which I



FIG. 11.—*Mesopsis hessei*, sp. n., ♂.

have doubtfully referred to the genus. The study of the genotype supports my statement that the genus *Shelfordites* should be referred to the subfamily *Catantopinae*, in the immediate neighbourhood of *Hemiacris* Walk. and *Euthymia* St.; I may add that the genus *Mecostibus* Karsch also belongs to this aberrant group.

Karny's statement that the mesosternal lobes in his species are subcontiguous is erroneous; the lobes are well separated by an interspace which is narrowed in the middle (owing to the convexity

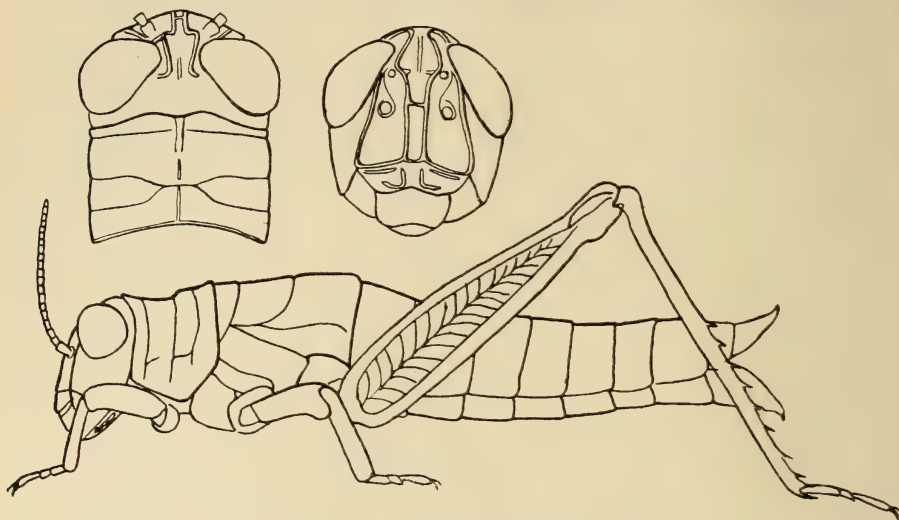


FIG. 12.—*Shelfordites aberrans*, Karny, ♀, type.

of the inner margins of the lobes), but even there about as broad as half the lobe.

S. aberrans differs from *S. nanus* by its considerably larger size; by the much rougher sculpturing characterised by the presence of rounded tubercles, especially on the pronotum; by the more prognathic head; by the shape of the lateral pronotal lobes; and by the inner side of the hind femora being black, with pale transverse ridges, throughout except two pale fasciae near the apex.

Genus SPATHOSTERNUM Krauss.

Spathosternum nigrotaeniatum (Stål).

South West Africa: Waterberg, February 1920, 2 ♂♂ (R. W. Tucker); Otjituo, January 1920, 1 ♂ (R. W. Tucker); Gaub, January 1919, 2 ♂♂, 1 ♀ (R. Lightfoot).

Genus *THISOICETRUS* Brunner Watt.

Thisoicetrus prasinatus (Stål).

1876. *Euprepocnemis prasinata*, Stål, Öfver. K. Vet. Akad. Forhandl., 1876, No. 3, p. 44.

1910. *Thisoicetrus sjöstedti*, Karny, l.c., p. 69 (*syn. nov.*).

A series of specimens from several localities in South West Africa : Ombombo, Kamanyab, Zesfontein, Kaoko Otavi, Hoarusib River (Otshu), Tsumeb, Otjiverongo, Okorosawe.

Karny's types are all badly discoloured by alcohol ; a male from Okahandja is selected here as the single type of *Th. sjöstedti*. The specimens before me agree quite well with this type and with Stål's paratype of *E. prasinata* from Damaraland, so that the above synonymy is beyond doubt.

Genus *ACORYPHA* Krauss.

1877. *Acorypha*, Krauss, Sitz.-ber. k. Akad. Wiss. Wien, 1 Abt., lxxvi, p. 38.

1889. *Caloptenopsis*, I. Bolivar, Jorn. Sci. Lisboa (2), i, p. 173.

The above generic synonymy has already been published by me (Trans. Ent. Soc. London [1925], 1926, p. 452), but I think it useful to repeat it here.

Acorypha pallidicornis (Stål).

South West Africa : Tsumeb, January 1921, 1 ♂ (E. Kochig).

Acorypha gilli, sp. n.

(Plate II, fig. 3.)

A large and robust species, remarkable for the colour of its hind wings.

♂ (*type*). Antennae longer than head and pronotum together, slightly compressed. Frontal ridge distinctly narrowed at the fastigium, gradually but feebly widened downwards, not impressed at the ocellum, bearing minute scattered punctures below the latter and fairly dense elongate ones above it. Fastigium of vertex decidedly sloping, forming a broad bow with the frontal ridge, slightly widened forward, distinctly sulcate ; interocular distance equal to the width of the frontal ridge between antennae.

Pronotum with the disc obtusely tectiform, smooth, but not shiny.

Metazona much longer than prozona. Hind angle of the disc obtuse, rounded. Median carina well developed, linear. Lateral carinae gradually diverging behind, obtuse, in metazona obsolescent, punctured. Lateral lobes much higher than long, densely punctured (even honeycombed) in metazona.

Elytra extending well beyond the hind knees, transparent in the apical half.

Prosternal tubercle transversely compressed, the sides straight, subconvergent towards the truncate apex. Mesosternal interspace quadrate. Metasternal lobes narrowly separated.

Hind femora very broad; upper carina acutely denticulate. Hind tibiae with six outer and seven inner spines; the inner lower spur not much longer than the outer one, regularly curved at the apex.

Supra-anal plate very long and narrow; its lateral margins straight and subparallel in more than basal third, then straight and convergent towards the narrow apex, which bears an acute triangular projection; the surface depressed and sulcate longitudinally. Cerci large, of the usual type for the genus.

Antennae, top of the head, and pronotal disc buff. Face testaceous; cheeks white; eyes narrowly margined with black behind. Lateral pronotal lobes in the upper half brown with two whitish spots in prozona, in the lower half whitish, with brown spots mainly in metazona. Elytra deep chocolate-brown, with narrow whitish fasciae and spots, in the basal half, except in the anal area which is pale buff; the apical half is hyaline, with an oblique brown fascia and a few spots of the same colour. Wings violaceous-blue near the base. Hind femora with the inner side and lower sulcus black, with a pale pre-apical ring; outer side white, with serially disposed round brown spots, and with blackish spots on the lower carina; knees brown above, black on the sides, with the lobes whitish. Hind tibiae dirty bluish, with a paler subbasal ring, followed by a darker one; spines with black tips.

♀ (*paratype*). Larger than the male. Pronotal disc brown, with two lateral buff stripes.

Length of body, ♂ 25, ♀ 38; pronotum, ♂ 5.5, ♀ 8; elytra, ♂ 25, ♀ 34; hind femur, ♂ 15, ♀ 21 mm.

South West Africa: Windhoek, November 1920, 2 ♂♂ (including the type), 1 ♀ (S. Gilman); Usakos, February 1920, 1 ♀ (R. W. Tucker); Zesfontein, February 1925, 1 ♀ (Mus. Exped.); 1 ♀ without exact locality; Okahandja, March 19–20, 1928, 1 ♂ (R. E. Turner; British Museum).

I have the pleasure to dedicate this beautiful species, easily recognisable by the coloration of its wings, to Dr. E. L. Gill, Director of the South African Museum.

The female paratype described above and figured belongs to a striped form parallel to the ab. *marginellus* Serv. of the Mediterranean *Calliptamus italicus* (L.).

Genus CATANTOPS Schaum.

Catantops sulphureus (Walker).

1870. *Catantops sulphureus*, Walker, Cat. Derm. Salt. Brit. Mus., iv, p. 695.

1873. *Catantops decoratus*, Gerstaecker, Arch. Naturgesch., xxv, p. 219 (*syn. nov.*).

1900. *Catantops solitarius*, Karsch, Entom. Nachr., xxvi, p. 280.

1901. *Catantops solitarius*, Krauss, Verh. zool.-bot. Ges. Wien, li, p. 289.

1925. *Catantops sulphureus*, Uvarov, Trans. Ent. Soc. London, 1925, p. 295.

South West Africa: Outjo, January 1926, 1 ♀ (Mus. Exped.); Okahandja, March 19-20, 1928, 1 ♂ (R. E. Turner).

The only difference between *C. sulphureus* and *C. decoratus* is the presence in the former of a small black spot on the outside of the hind femora; this spot, however, varies in size, and may be fairly large or represented only by a minute dot; this dot may disappear altogether, and I have before me one female from Zanzibar in which there is a dot on the left femur, but no dot on the right one. The character is obviously of no value.

Catantops debilis Krauss.

South West Africa: Okahandja, March 2-29, 1928, 1 ♂, 3 ♀♀ (R. E. Turner; British Museum); Warmbad, Kaokoveld, February 1925, 2 ♂♂; Outjo, January 1925, 2 ♀♀; Hoarusib (Otshu), March 1926, 1 ♂; Otjikondo, January 1925, 1 ♂; Kamanyab, March 1925, 1 ♀ (Mus. Exped.); Narebis, March 1921, 2 ♀♀ (K. H. Barnard).

Catantops melanostictus Schaum.

South West Africa: Otjituo, January 1920, 2 ♂♂ (R. W. Tucker); Grootfontein, December 1918, 1 ♀ (R. M. Lightfoot); Nuragas,

January 1919, 2 ♀♀ (R. Lightfoot); Tsumeb, December 1919, 2 ♀♀ (R. W. Tucker).

Genus *ACRIDODERES* I. Bolivar.

Acridoderes crassus I. Bolivar.

South West Africa : Kuring Kuru, Okovango, February 1923, 1 ♀ (R. Dickman).

Known previously only from Angola and Mashonaland.

Genus *SCHISTOCERCA* Stål.

Schistocerca gregaria (Forsk.) ph. *flaviventris* (Burmeister).

South West Africa : Kamanyab, January 1925, 1 ♀ (Mus. Exped.) ; Omaruru, 1921, 1 ♀ (J. S. Brown).

This is the non-swarming phase of the desert locust of North Africa and South-Western Asia. There is no doubt that the species swarms occasionally in South West Africa as well, but it has never been distinguished by farmers and by local entomologists from other native species of locusts. (On this subject see pp. 254 and 273 of my book : "Locusts and Grasshoppers," London, Imperial Bureau of Entomology, 1928.)

Genus *ANACRIDIDIUM* Uvarov.

1923. *Anacrididium*, Uvarov, Ann. Mag. Nat. Hist. (9), xi, pp. 141, 485.

Anacrididium moestum (Serville).

South West Africa : Omaruru, 1921, 2 ♂♂ (J. S. Brown) ; Warmbad, Kaokoveld, February 1925, 1 ♀ (Mus. Exped.).

Genus *CYRTACANTHACRIS* Walker.

Cyrtacanthacris tatarica (Linné).

South West Africa : Narebis, 1921, 1 ♂ (K. H. Barnard) ; Sandfontein, January 1921, 1 ♀ (S. Gillman) ; Kaross, February 1925, 1 ♀ (Mus. Exped.).

Cyrtacanthacris aeruginosa aeruginosa (Stoll).

Ovamboland : Ondongua, February 1921, 1 ♂ (K. H. Barnard).

Genus *KRAUSSARIA* Uvarov.

1923. *Kraussaria*, Uvarov, Ann. Mag. Nat. Hist. (9), xi, p. 104.

Kraussaria prasina (Walker).

South West Africa : Kaoko Otavi, March 1926, 1 ♂ (Mus. Exped.).

EXPLANATION OF PLATE II.

1. *Pycnodictya herero*, Karny, ♀ (p. 51).
2. *Bufotettix rubridens*, g. et sp. n., ♂. Front view of the head (p. 58).
3. *Acorypha gilli*, sp. n., ♀ (p. 71).





ACRIDIDAE FROM SOUTH WEST AFRICA

3. *A Revision of the South African Gryllacridae (Orthoptera Saltatoria).*
By H. H. KARNY (Buitenzorg, Dutch East Indies).

(With 25 Text-figures.)

THROUGH the kind mediation of Dr. B. Uvarov (British Museum, London), I received from the Trustees of the South African Museum (Cape Town) the whole Gryllacrid collection of that museum for study. Though this collection was not very large, it contained nearly all the species hitherto known from South Africa, including Péringuey's and Griffini's types, some of the species being represented by considerable series. This fact suggested the desirability of including all the known South African species in the following paper, and of giving keys for their determination. A study of the subfamily *Gryllacrinae* has already been based on material from the South African Museum by Griffini (141), *Mon. Zool. Ital.*, xxii, 5, pp. 125-134 (1911), whilst the other subfamilies have been studied (partially) by Péringuey, *Ann. S. Afr. Mus.*, xv, pp. 401-425, pl. xlii (1916). Though Griffini stated in his paper that the collection studied by him was somewhat poor in species, it contained practically all the known South African *Gryllacrinae*: there are not very many species of this subfamily occurring in South Africa, whereas in Tropical Africa the subfamily is very rich in species, as may be seen from Griffini's "Catalogo" (126), *Boll. Mus. Zool. Anat. Torino*, xxvi, No. 634, pp. 5-19 (1911). This is also the reason why I have included in the following species-keys of *Gryllacrinae* the South African species only, whereas in the species-keys of the other subfamilies all the species known at present from the African continent have been included. In the keys to genera and subfamilies, on the other hand, I have included such only as are represented by one or more species in South Africa. As to the literature, I refer to Kirby's *Catalogue of Orthoptera*, vol. ii, 1906. Only the more recent records are cited in the following pages.

I take this opportunity of expressing my sincerest thanks to all those who have aided my studies by lending me material from their collections, and I hope this paper will stimulate some of the South African entomologists to pay further attention to this very interesting

group of insects, which at present is still far from being completely known.

Key to the Subfamilies.

1. Fastigium verticis convex or plain, never sulcate.
 2. Fore coxae without any spine. Pronotum dilated cephalad. Fore tibiae spined above *Stenopelmatinae*.
 - 2'. Fore coxae with a spine or tooth.
 3. Fore tibiae, except for the apical spurs, spineless above. Winged or wingless species *Gryllacrinae*.
 - 3'. Fore tibiae spined above. Always wingless *Henicinae*.
- 1'. Fastigium verticis compressed between antennae, longitudinally deeply sulcate or divided by a vertical furrow into two tubercles.
 2. Tarsi depressed, with long appendages *Schizodactylinae*.
 - 2'. Tarsi compressed, without appendages *Rhaphidophorinae*.

SUBFAM. STENOPELMATINAE.

This subfamily is represented in Africa by one genus only.

Genus MAXENTIUS Stål.

Key to the Species of Maxentius.

1. Fore tibiae, except for the apical spines, with 3 or 4 spines above on the inner side. The two curved, spine-like processes of ♂ 10th tergite close together (fig. 2).
 2. Except the dark tips of spines and the black eyes, uniformly pale in colour, in life almost semitransparent white (*teste* Péringuey).
Maxentius canus Péringuey.
 - 2'. Whitish grey; pronotum darkened along fore and hind margin, meso- and meta-notum and abdominal tergites with broad blackish bands along hind margin *Maxentius kuhlgatzi* Karny.
- 1'. Fore tibiae, except for the apical spines, with only 2 spines above on the inner side. Spines of 10th ♂ tergite widely separated from each other, near the lateral margin (fig. 3).
 2. Brownish yellow; pronotum along fore and hind margin, and the following dorsal segments along hind margin each with a broad blackish transverse band. Fore femora without spines. Hind femora spined along lower inner margin only *Maxentius pallidus* (Walker).
 - 2'. Uniformly dark brown. Fore and hind femora spined below on both margins *Maxentius pinguis* (Walker).

Maxentius canus Péringuey (*loc. cit.*, p. 415).

1 ♂ (type), Port Nolloth, 1912.

Without doubt a good species. The number of spines on legs somewhat variable, different on right and left side, but diverging enough from the other species to justify the species being based upon

this character. All spines with dark tips. Fore femora with 3 to 4 rather long, more or less horizontal outwardly directed spines on the outer margin; 3 to 4 shorter ones more downwardly directed on the inner margin. On middle femora along lower fore margin distad from the middle 3 rather long projecting spines; the hind margin of the left femur with 1 spine at the end of basal third and 2 in distal third, on the right femur 3 spines in basal half and 2 shorter ones near the knee. On the hind femora, the spines below on the inner margin are short and more downwardly directed, on the outer margin long and projecting outwardly; with 7 on the inner margin on both legs,



FIG. 1.—*Maxentius canus*.—Above: Left hind tibia, seen from inside above.
Below: Lateral part of basal abdominal tergites.

irregularly distant from each other, beginning well before the middle; on the outer margin of left femur 1 short spine near base, then 3 longer ones before the middle rather close together, with 2 separated ones in the middle, and finally, near the knee, 4 closer together, the first two of these being short, the third the longest; on right hind femur, 3 rather separated spines before the middle, increasing in size distad, then a space without any spines, and finally, near the knee, 3 close together, the middle one of them being hardly half as long as the two others, the first somewhat longer than the third. In spite of their variability, it is quite clear that the rows of spines on the hind legs begin distinctly nearer the base than in *kuhlgatzii*.

Fore tibiae spineless above on the outside, with 3 to 4 spines on the inside, the last (distal) one of them being decidedly the longest; below with but 1 spine close before the apex on the inside, and with

3 to 4 on the outside. Middle tibiae above with 3 spines on either side; below with 2 spines in distal half of outer side, and 1 on inner side inserted between the 2 outer ones. Hind tibiae spineless below, except for a single spine on the outside just before the apex; along the whole inner margin densely and pectinately long-pilose (fig. 1), the bristles on the outside being short and scanty; above on the outside 5 spines and a pectiniform row of bristles as well, on the inside with 6 to 7 spines and with scanty, short bristles. The inner apical spurs of hind tibiae about twice as long as the outer ones, reminding one of *Stenopelmatus* by their compressed, nearly spade-like shape.

Péringuey's statement that the first three abdominal tergites are smooth laterally could be easily misunderstood; the surface itself is indeed smooth, without the numerous, finely spined tubercles present in *pinguis*, but the second and third tergites possess a lateral oblique costula (fig. 1) just as in the other species.

Maxentius kuhlgtzi Karny.

1910. Karny, Jenaische Denkschr., xvi (Schultze, Forsch. Südafri., iv), p. 36.

1 ♂ (det. Karny), S.W. Africa, Swakopmund.

Measurements.—Length of body 40 mm., pronotum 7 mm. in the middle line, 8 mm. on lateral lobes, fore femora 11 mm., middle femora 10.5 mm., hind femora 16.3 mm., hind tibiae 17.3 mm.

General colour pale greyish white; frons below antennae and eyes with a very ill-defined, nebulous bluish-grey spot on either side, and almost the whole clypeus is also of the same colour. Cheeks and occiput very diffusely darkened with grey, this colour not being uniform but spotted with paler, thus showing more or less linear or reticulate markings, but all very indistinctly defined and nebulous. Pronotum along fore and hind margin with a broad, dark grey transverse band, but these also not well defined. Lateral lobes with a nebulous, inverted-V-shaped dark band along the hind oblique sulcus and the ascending branch of the V-sulcus. Between the two branches of the V-sulcus, a very nebulous dark cloud extending on to the disc. Meso- and meta-notum and the first to eighth abdominal tergites along the hind margins very broadly blackish, ninth tergite slightly darkened with grey, tenth quite pale, but the two spine-like processes dark. All femora diffusely brownish grey before the knee, the knee itself pale again; all tibiae greyish yellow.

Arrangement of Spines—Fore femora on inner margin below with 1

to 2 dark-tipped spinelets in distal half, quite unarmed on the outside. The left middle femur outside with 1 spinelet close before the knee, inside with one at the same place and, moreover, with a similar one near base. Right middle femur inside with 4 rather long spines in basal two-thirds, outside with 3 in distal half (the first being placed in the middle of femur). Hind femora with 4 on the outer margin and 4 to 7 spinelets on the inner margin below, the outer much longer and stronger than the inner ones; the spines beginning at the middle of the femur or a little before it, but never as far basally as in *canus*. Fore tibiae above on the inside with 3 long spines, increasing in length distally; below outside with 3, inside with but 1 spine close before the apex (the apical spines being not included in these numbers). Middle tibiae spined exactly as in *canus*. Hind tibiae below with a single spine just before the apex, above outside with 4 spines (right leg)

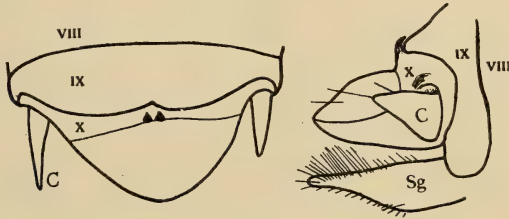


FIG. 2.—*Maxentius kuhlgaizi*. End of ♂ abdomen in dorsal and lateral view.

or 7 (left leg), the first of these in the latter case very small, and hardly distinguishable with certainty; above inside with 6 spines on either tibia; bristles quite as in *canus*.

Abdomen.—Second and third tergite laterally, each with an oblique costula, finely denticulate under the microscope (as in the other species, compare fig. 1). The surface before it and the pleurae are smooth as in *canus*. Ninth tergite strongly produced backwards in the middle, much longer than the eighth, obtuse-angularly excised in the middle of hind margin (fig. 2). In *canus*, too, this tergite is decidedly longer than the eighth, though somewhat less strongly produced than in *kuhlgaizi*, and the median excision of hind margin is also deeper. The two spines of tenth ♂ tergite are placed quite close together just near the median line, but otherwise shaped as in *pinguis*, viz. hook-like, upcurved forwardly, dark blackish and acutely pointed at apex. We also find the same condition in *canus*, but the spines in *canus* are placed even closer together than in *kuhlgaizi*. The cerci of the latter are even shorter and thicker than in *pinguis*.

Maxentius pallidus (Walker).

Syn. : *fuscofasciatus* Stål.

The following material now before me (all det. Karny) : 1 ♀, Transkei, Kentani, 1900 ; 1 ♀, Cape Town, x, 1889 ; 1 ♂, Cape Town, A. Miller, 1906 ; 1 juv. ♂, 1 ♀, Cape Town, L. Pursey, vii, 1885 ; 1 ♂, Ceres Div., Matroosberg, 4000 ft. ; 1 ♀, Cape Town, 1875 ; 1 ♂, 1 ♀, Cape Town ; 1 ♂, Sir Lowry's P., Pursey ; 1 juv. ♂, Gt. Winterhoek, Tulbagh, 4500 ft.

The differences from *pinguis* have already been indicated by Stål and Brunner quite satisfactorily. It is true that the spination of the femora is not absolutely reliable, but it agrees with the descriptions in by far the most cases. It may be, however, that in *pinguis* the fore femora are also occasionally quite spineless, and in one of the *pallidus* specimens now before me one hind femur possesses also one spinelet outside, the other even two. But this is, of course, an exceptional case, in all the other *pallidus* specimens the hind femora are quite spineless outside, and in a great number of them even on the inside too. A much more reliable character seems to be the coloration of the body. To this is to be added that in *pallidus* (and in this only of all the four species) a lateral costula is present on the third tergite only ; on the second there is usually on this place a pale stripe, but absolutely no sculpture at all. The surface in front of it is either quite smooth as in *canus* and *kuhlgatzi*, or with a very fine punctuate sculpture, and thus quite different from that of *pinguis*. The hind femur shows on the inner side just below the upper margin a sharp edge as in *canus* and *kuhlgatzi*, but no row of spines below it, as is the case in *pinguis*. The spines of the tenth ♂ tergite, finally, are at the same place as in *pinguis*, viz. removed laterally, but they are not acutely pointed and not hook-like and curved forward as in all the other species, but simply dentiform, directed straight upward and rather obtusely pointed, quite pale.

Finally, according to the material now before me, *pallidus* and *pinguis* seem to be geographically separated, as has already been pointed out by Péringuey (*loc. cit.*, p. 414), *pallidus* occurring in Cape Colony itself, *pinguis*, on the other hand, further north on the west (S.W. Africa) as well as on the east (Delagoa Bay).

Maxentius pinguis (Walker).

Syn. : *repens* Stål.

I have before me the following material (all det. Karny) : 1 ♂, 1 ♀

without locality label; 2 ♂♂, 2 ♀♀, S.W. Africa, Otjiverongo (S.A.M. Exp.); 1 ♀, Delagoa Bay; 1 ♂, Dr. Melle, Areturus, 1915, Salisbury; 1 ♂, Nylstroom Dist., Transvaal, '06, A. Tucker; 1 ♂, S.W. Africa, Windhoek (S.A.M. Exp.).

This species too is very well characterised, not only by the uniformly dark colour of the upper surface of the body, but by the hind tibiae being covered all round with equally dense and equally long bristles as in *pallidus*, and not with the two rows of pectiniform bristles so very striking in *canus* and *kuhlgatzi*. Ninth ♂ tergite—quite as in

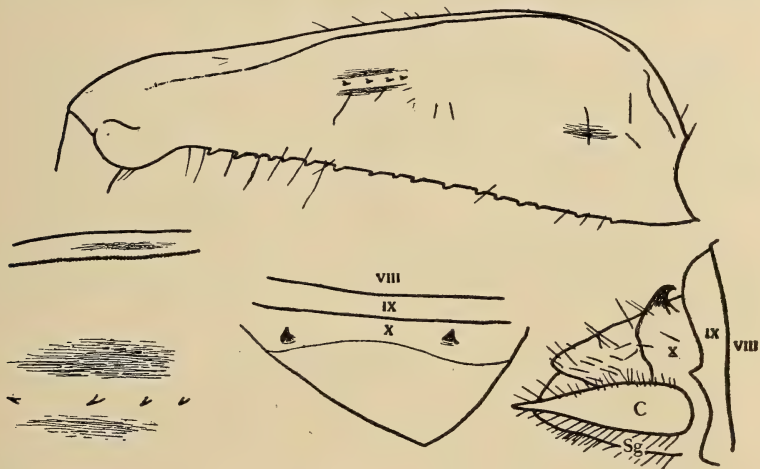


FIG. 3.—*Mazentius pinguis*. Above: Hind femur from inside, showing the stridulating structures. Below: Stridulating structures of hind femur more magnified (left); end of ♂ abdomen in dorsal (middle) and lateral view (right).

pallidus—transversely truncate behind, not produced backwards and not longer than the eighth. The two spines of tenth ♂ tergite (fig. 3) are placed far to the sides as in *pallidus*; they are blackish, however, acutely pointed, hook-like, and upcurved forwards as in *canus* and *kuhlgatzi*.

The second and third abdominal tergites each possess laterally an oblique costula as in *canus* and *kuhlgatzi*. The surface in front of it, however, is, contrary to all the three other species, strongly sculptured: there are in front of each costula and, moreover, in the same region of the first tergite as well as in the neighbourhood on the pleurae, slightly elevated, polygonal, but not well-defined tubercles, each of them ending in a fine spinelet; behind the costula the second and third tergites are quite smooth. With that areolation there corre-

sponds on the inner side of the hind femur not only a strong longitudinal ridge close below the upper margin, finely denticulate under the microscope, but also a slightly elevated longitudinal pad at about the middle of the inner surface, furnished with some acutely pointed spines (fig. 3). This row of spines is absent in all the other species. There can be no doubt at all that we have here to do with a stridulating sculpture. Though Brunner v. W. (Mon., p. 252) had already supposed this, it was but recently that Duncan (Entom. News, xxxiv, pp. 73-77, 1923) had described similar stridulating sculptures from *Stenopelmatius*, and also observed the stridulation in living specimens, so that now no doubt remains as to the significance of such sculptures. Further investigations are now necessary to show whether auditory organs cannot also be found in Stenopelmatinae. It is true I found on the pleurae of all the four *Maxentius* species a narrow opening (fig. 1), at the same place where the auditory organ in short-horned grasshoppers is located, but I am inclined to consider this as an enlarged spiracle rather than as a tympanum. The spiracles of the following segments have a similar shape, though they are much smaller. At all events, a further and more detailed anatomical study of this question is very desirable.

SUBFAM. GRYLLACRINAE.

Key to the South African Genera of Gryllacrinae.

1. Tegmina and wings fully developed *Gryllacris* Serville.
- 1'. Tegmina and wings quite absent.
 2. Fore and middle tibiae with 3 to 4 spines on either side (the apical spines excepted) *Eremus* Brunner v. W.
 - 2'. Fore and middle tibiae with only 2 spines on either side (the apical spines excepted) *Ametroides* Karny.

Gen. GRYLLACRIS Serville.

This genus, though very rich in species in Tropical Africa, is represented in South Africa by not more than two species, viz. :

- Head and pronotum with black linear markings. Tegmina and wings reaching far beyond abdominal apex and hind knees . . . *Gryllacris lyrata* Kirby.
- Head and pronotum without black lines. Tegmina and wings hardly reaching abdominal apex *Gryllacris nana* Brunner v. W.

Gryllacris lyrata Kirby.

Compare Griffini (141), *loc. cit.*, p. 128.

1 ♂ (det. Griffini), Kafue Riv., N. Rhodesia, J. Drury, 1906 (wings spread on both sides); 1 ♂ (det. Karny), S.W. Africa, Tsumeb, 1920

(not spread); 2 ♂♂ (det. Karny), Salisbury, September 1913 (not spread); 1 ♀ (det. Griffini), no locality (spread on both sides); 1 ♀ (det. Griffini), Delagoa Bay, i, 1890 (spread on both sides); 1 ♀ (det. Karny), Khama's, Bechuanaland (spread on both sides); 1 ♀ (det. Karny), Grootfontein, S.W. Africa, January 1919, R. Lightfoot (not spread); 1 ♀ (det. Karny), Potgieters Rust, Transvaal, G. M. Melle, October 1919 (not spread); 1 ♀ (det. Karny), without locality label (not spread); 1 ♀ (det. Karny), Salisbury, September 1913, on rose flowers (not spread); 1 juv. ♀ (det. Griffini), Delagoa Bay, i, 1890; 1 juv. ♀ (det. Karny), Windhoek, S.W. Africa, Dr. Froemberg, 1909.

The black lines on head and pronotum thick and well defined in all imagines, whilst in larval stages hardly distinguishable, nebulous, and not very dark. The hind tibiae of almost all the specimens have a well-defined, brownish-violet base, like certain species of the Australian *munda* group. Size somewhat variable, the tegminal length varying from 22.4 to 28.5 mm. (♂), and from 24 to 28.8 mm. (♀).

Tegmina.—Three to five simple or (in some cases) simply forked precostals, the last of them convex forward and usually roughly parallel to the costal vein. This latter slightly convex forward in basal part, afterwards straight, reaching fore margin between the middle fifth and third. Costal area hyaline like the neighbouring areas, gradually dilated distally, broadest at about the middle of tegmen. Subcosta arising from tegminal base, slightly S-curved, emitting before the end 2 (exceptionally 3) fore branches into fore margin, or the first of them running into costal vein. Radial vein (fig. 4) anteriorly pectinately five- to six-branched, exceptionally only four-branched, the branches longitudinally directed, rather close to each other, all running into fore margin; the ramification beginning close after the origin of radial sector, in one case even just before it. Radial sector arising from radial vein between the middle of tegmen and the end of middle fifth, posteriorly pectinately four- to five-branched, the hindmost of the branches usually about as long as stem of sector, though sometimes distinctly shorter or decidedly longer; second and third branch arising exceptionally by a common stem (fig. 4). Medial vein free from base, very close to radial stem, from cubital vein fully four to five times as distant as from radial, anteriorly pectinately three-branched; chief fork just after the end of basal fourth, bifurcation of hind branch about at the end of basal third; but in one case the fore branch of this second fork is bifurcate again just thereafter (fig. 4). The hindmost branch may be

united before the end for some distance with cubital vein or with the preceding medial branch, though thereafter running freely again into apical margin. Cubital vein free and simple, without any relation to medial vein, slightly S-curved near medial fork. Then follow further 4 free, simple longitudinal veins.

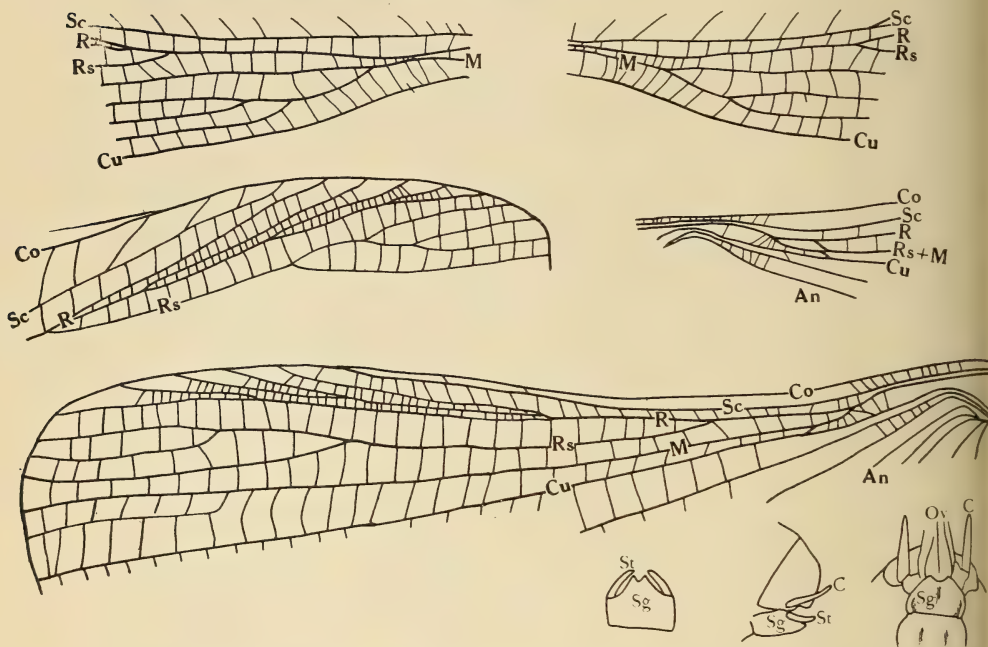


FIG. 4.—*Gryllacris lyrata*. Left middle : ♀, apex of right tegmen, with an anomalous ramification of radii sector. Right middle : ♀ from Delagoa Bay, anomalous base of left hind wing, seen from below. Above : ♀, ramification of medial vein on both tegmina (right normal, left with one supernumerary branch). Below : the same ♀, preanal part of left hind wing, anomalous ; media and radii sector arising separately from radial vein. Lowermost : ♂ subgenital plate, end of ♂ abdomen in lateral view, end of ♀ abdomen in ventral view. All figures of the same magnification.

Hind Wings.—Costal area with rather dense cross-veins from base till deviation of radial stem from subcostal vein, then for a long distance without cross-veins, and just before the end with one or a few obliquely directed, rather strong cross-veins again. Radial vein forked as in tegmina, but the ramification beginning already before the middle, the branches, therefore, directed still more longitudinally. In one of the hind wings before me (fig. 4, above) the ramification of radial vein is somewhat anomalous ; it emits at first one hind branch

which is simply forked in its distal part ; just after this chief fork, the fore branch is forked again into a simple fore branch and a hind branch which is bifurcate again shortly beyond its middle ; in all, five branches as usual, but the order of their ramification is anomalous. $Rs+M$ arising from radial stem where this curves again into a longitudinal direction after the deviation from subcostal vein ; $Rs+M$ touches at one point the cubital vein (which has a free origin and remains simple), or emits a short M_2 against it. The simple medial vein arises from $Rs+M$ at about the end of basal third ; the radial sector is itself then pectinately four-branched backward in apical third of wing-length, but one of the branches may have a further short apical fork. In one case the first cross-vein between radial vein and $Rs+M$ is decidedly oblique (fig. 4, right middle), thus giving the impression of a doubled $Rs+M$ root. Is this perhaps an atavistic formation signifying some relations to the Neotropical species and to the Australian *munda* group ? In all the other cases now before me the $Rs+M$ root is always simple in *lyrata*. But there is another hind wing (fig. 4, below) in which radial sector and medial vein show no relations at all to one another, both arising quite independently and freely from the radial stem, viz. the simple medial vein near the wing-base where radial stem deviates from subcostal vein, and the radial sector just before the end of basal third of wing-length, then being pectinately three-branched backward in the apical third. I am, however, inclined to believe that this is a secondary dissolution of $Rs+M$ rather than a primitive formation, though there is no doubt that the latter condition is suggested by the case with exceptionally doubled $Rs+M$ root just mentioned. Middle part of anal fan with thirteen to twenty cross-veins in any area.

Gryllacris nana Brunner v. W.

Compare Griffini (141), *loc. cit.*, p. 126.

1 ♀ (det. Griffini), Cape Colony, Port St. Johns, " Found in a cocoon of leaves under tree bark."

Griffini has published this specimen and a second one I have not before me as "*nana* var," without giving a name to that variety. This, in fact, is nothing else than the true *nana*, as the chief character of Griffini's variety cannot stand, because Brunner's description of his type specimen is incorrect in this respect, as I have shown in my revision of the Gryllacridae of the Vienna Museum. Griffini had not

seen Brunner's type specimen, but knew it from Brunner's description only. Supplementing Griffini's description, I give here a figure of the ♀ subgenital plate, and a discussion of the tegminal and wing venation, which have not yet been described either by Griffini or by Brunner.

Tegmina (fig. 5).—Two simple precostals; at the end of the second one the fore margin being slightly emarginate. Costal vein slightly convex forward, simple, reaching fore margin not before the apical fourth of tegmen. Costal area in the same condition as the others, band-like, though somewhat wider than the others, broadest at about the middle of tegmen. Subcostal vein arising from tegminal base,

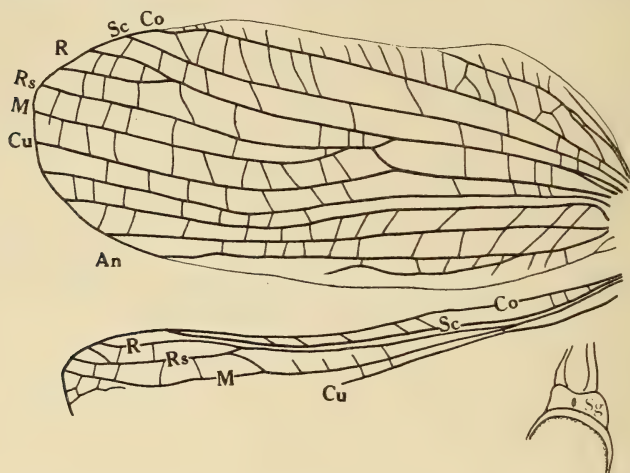


FIG. 5.—*Gryllacris nana*, ♀. Left tegmen, preanal part of left hind wing, and ♀ subgenital plate.

slightly S-curved, with a very small, simple, apical fork. Radial vein simple or simply forked at the end. Radial sector arising from radial vein somewhat before the middle of tegmen, and receiving just after its origin a distinctly oblique cross-vein from the cubital stem which may perhaps represent the base of the medial vein. At the distance of a cross-vein from it the simple media branches off backwards from the radial sector, so that it cannot be said with certainty whether in fact it starts from the radial sector, or whether from the cubital stem, being only united near the base with the radial sector for some distance. Radial sector itself with a very small apical fork. Cubital vein simple. There follow, furthermore, five simple longitudinal veins; the common stem of the last two not quite half as long as the radial stem from base to the origin of radial sector. The last longi-

tudinal vein is less developed than the others, ending near the middle of tegminal hind margin.

Hind wings decidedly cycloid, of a similar condition apically as the tegmina, otherwise hyaline. A moderately long space in costal area before its middle without cross-veins. Subcostal and radial veins simple throughout. Medial vein simple, arising from the radial stem where this curves again into the longitudinal direction after the deviation from the subcostal vein. Radial sector arising from radial stem not before the apical third, receiving (on both wings!) just after its origin a very distinct oblique vein from the medial, then simple at the end or with a very small apical fork. Cubital vein free from base, receiving from medial root a short inconspicuous cross-vein; thence simple till the end. Middle part of anal fan with 7 to 9 cross-veins in every area.

Gen. EREMUS Brunner v. W.

Key to the South African Species of Eremus.

♂♂.

1. ♂ subgenital plate produced at the end into a narrow median lobe showing a sharp, deep fissure (fig. 7) . . . *Eremus sphinx* (Gerstaecker).
- 1'. ♂ subgenital plate without any median fissure at the end.
 2. ♂ subgenital plate produced at the end into a broadly triangular median lobe, on either side of which there is a small triangular lateral lobe (fig. 9) . . . *Eremus chimaera* Griffini.
 - 2'. ♂ subgenital plate not lobate, rectangular, with rounded angles and a straight or slightly convex hind margin
Eremus glomerinus (Gerstaecker).
3. Clypeus and upper side of femora darkened brownish. Tarsi spotted piceous . . . *Eremus glomerinus* (Gerstaecker) s. str.
- 3'. Clypeus, femora, and tarsi uniformly pale brownish yellow
Eremus glomerinus var. *knothae* Griffini.

♀♀.

1. Ovipositor broad, rounded at the tip (fig. 6). ♀ subgenital plate transversely rectangular, with rounded angles, hind margin scarcely emarginate
Eremus obtusus nov. sp.
- 1'. Ovipositor evenly pointed at apex or even slightly emarginate above.
 2. ♀ subgenital plate divided by a broad angulate excision into two large, lateral diverging lobes (fig. 7) . . . *Eremus sphinx* (Gerstaecker).
 - 2'. ♀ subgenital plate with backwardly directed lobes or without any excision at all.
 3. ♀ subgenital plate with a rectangular excision (fig. 8). Ovipositor somewhat longer than the body *Eremus sphingoides* nov. sp.
 - 3'. ♀ subgenital plate either without any excision or with a narrow fissure. Ovipositor shorter than the body.

4. ♀ subgenital plate short, slightly rounded or transversely truncate at the end, with an S-like emargination laterally (fig. 9). Ovipositor about one and a half times as long as hind femur, decidedly shorter than the body, evenly obtusely pointed at apex. *Eremus chimaera* Griffini.
- 4'. ♀ subgenital plate short, bilobate, the lobes lying close together, backwardly directed, rather acute, separated from each other by a narrow median slit. Ovipositor a very little longer than hind femur, strikingly broad, at the end pointed from below, slightly emarginate above before the acute apex (fig. 10)
- Eremus glomerinus* (Gerstaecker).
5. Clypeus and upper side of hind femora darkened brownish. Tarsi with pitchy spots
- Eremus glomerinus* (Gerstaecker) s. str.
- 5'. Clypeus, femora, and tarsi uniformly pale brownish yellow

Eremus glomerinus var. *knothae* Griffini.

Eremus obtusus nov. sp.

1 ♀ (type), Cape Town, P. C. Keytel, 1913.

Measurements.—Length of body 15.7 mm., pronotum 3.5 mm., fore femur 4.5 mm., left hind femur 8.7 mm., right hind femur 5.6 mm., ovipositor 12.3 mm.

Body more massive than in the other South African *Eremus* species, with short strong legs. General colour brownish yellow, some of the dorsal segments indistinctly darkened along the hind margin.

Head hardly wider in dorsal view than pronotum, obovate in frontal view. Boundary between occiput and vertex with two dark spots side by side, lateral to these a nebulous oblique band directed backwards and outwards. Fastigium of vertex fully one and a half times as wide as the first antennal joint, flattened in front, with rather obtuse lateral margins. No ocellar spots. Frons and mouth parts without any peculiarity. Pro-, meso-, and meta-notum as described by Griffini for *peringueyi*.

Fore tibiae, except the very small apical spines, with 4 well-developed spinelets below on either side, which are distinctly shorter than the tibia is thick, and somewhat adjacent. Middle tibiae with but 3 such below on inner margin; on fore (outer) margin there is basally present (on both tibiae) a supernumerary very small spinelet, thus 4 in all, the first of them being much smaller than the others. Hind femora very thick and strong, with 4 very small black-tipped spinelets on inner margin distally below and 3 such on the outer

margin. The right hind leg is without doubt a regenerate, being much shorter and feebler than the left, the femur spineless throughout. Left hind tibia cylindrical and spineless in basal third, flattened above in middle third, and with 6 very small, black-tipped spinelets on either side above. The right hind tibia is cylindrical throughout, showing only 1 very small spinelet on either side near the middle above; its apical spurs too are much less developed than on the left tibia.

♀ subgenital plate (fig. 6) transversely rectangular, with the sides very slightly converging distally, hind margin with a very slight obtusangular emargination in the middle, slightly arcuate on either side. Ovipositor slightly curved at base only, thence quite straight, very wide (high), rounded off at apex.

At once easily distinguishable from all the other *Eremus* species; agreeing in most characters with *Ametroides peringueyi* (Griffini), but distinctly differing from it by the more numerous spines on fore and middle tibiae.

Eremus sphinx (Gerstaecker).

Compare Griffini (141), *loc. cit.*, p. 130.

1 ♂ (det. Griffini), Cape Town, S. 152; 1 ♂ (det. Karny), no locality; 1 ♂ (det. Karny), Cape Town; 1 ♂ (det. Karny), Cape Town, Barnard, 1914; 1 ♀ (det. Griffini), Stellenbosch, L. Péringuey, 1897; 1 ♀ (det. Karny), Cape Town, 1893; 1 ♀ (det. Karny), Ceres Div., Matroosberg, 4500 ft.; 1 ♀ (det. Karny), Cape Town, Master Péringuey, 1909.

As a completion of Griffini's detailed description (*loc. cit.*), I give here figures of the sexual characters of both sexes (fig. 7). I have, moreover, compared the ♀♀ with Gerstaecker's type specimen (Mus. Berlin), and have found that they agree completely with it in all characters. The sternites of the type, including the subgenital plate, have been cut open throughout

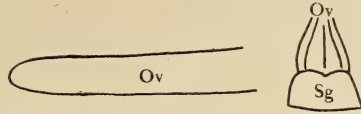


FIG. 6.—*Eremus obtusus*, ♀. Apex of ovipositor (left) and subgenital plate (right).

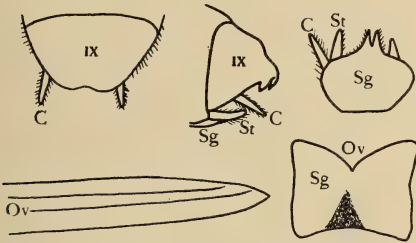


FIG. 7.—*Eremus sphinx*. Above: End of ♂ abdomen in dorsal, lateral, and ventral view. Below: Apex of ovipositor and ♀ subgenital plate. All figures of the same magnification, higher than in fig. 6.

the length during preparation, and for this reason the shape of the subgenital plate is not easily distinguishable without comparison with other material and has therefore in all probability not been described by Gerstaecker. But, when comparing the type with un-mutilated specimens, it can be stated with certainty that in the type too this plate had the same shape.

Judging by the material before me, this species seems to be by far the commonest *Eremus* species of Cape Colony.

Eremus sphingoides nov. sp.

1 ♀ (type), Cape Town, R. Trimen, vii, 1885.

Measurements.—Length of body 14.3 mm., pronotum 3 mm., fore femur 3.7 mm., hind femur 6.8 mm., ovipositor 15.3 mm.

Slender, very similar in general appearance to *E. sphinx*. Rather uniformly yellow-brown, without ocellar spots.

Head a little wider in dorsal view than pronotum, narrowly obovate in frontal view. Occiput and vertex very strongly convex. Fastigium verticis rather flattened, with rather sharp lateral keels; together with the whole frons very finely microscopically and densely punctured, but beyond this the frons is without larger impressed punctures. First antennal joint narrow at base, then strongly dilated above and here more than half as wide as the fastigium of vertex. Frons with two dark, almost vertical stripes near the middle, which converge downwards and unite on the clypeus.

Pronotum somewhat wider than long, with the fore margin rounded, only slightly produced in the middle, hind margin emarginate. Fore cross sulcus very feebly indicated, otherwise the disc practically without distinguishable sculpture, the sulci on the lateral lobes normal, though little impressed. Shape of lateral lobes as in *shelfordi*.

Spines of fore and middle tibiae as in *shelfordi*, but the left fore tibia has on the outer margin basally below an additional supernumerary spine. Hind femora unusually well developed, below with 4 to 6 dark-tipped spinelets on either side.

Hind tibiae as in *shelfordi*.
♀ subgenital plate with straight, distally strongly converging lateral margins, obtusangularly excised at apex, with obtusangular, scarcely rounded lobes (fig. 8). Ovipositor very slender, distinctly upcurved at base, thence almost straight, acutely pointed at apex.

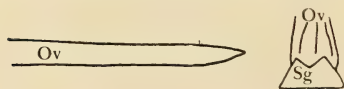


FIG. 8.—*Eremus sphingoides*, ♀. Apex of ovipositor and ♀ subgenital plate. Same magnification as fig. 6.

In general very similar to *sphinx*, differing from it by the less numerous spines on fore and middle tibiae, and by the shape of the ♀ subgenital plate. Among all the species known up to now this is without doubt most closely allied to *E. shelfordi* from Mauritius, differing from it chiefly by the shape of ♀ subgenital plate, the lobes of which are much more rounded off in *shelfordi* (of which species I have studied the type in the Hope Department, Oxford) and the sides decidedly S-curved. In the circumstances it would have been natural to consider *sphingoides* as a variety or subspecies of *shelfordi*, but in view of their wide geographical separation I think it wiser to treat *sphingoides* as a distinct species, especially as no similar form is so far known from the entire intermediate region. Neither do we yet know the ♂♂ of either *shelfordi* or *sphingoides*—which may perhaps differ by more striking characters.

Otherwise, *sphingoides* cannot be mistaken for any other of the hitherto known species.

Eremus chimaera Griffini (141), *loc. cit.*, p. 133.

1 ♀, Cape Town, Master Péringuey, 1909 ; 1 ♂ (allotype), Cape Town, Barnard. Both det. Karny.

The hitherto unknown ♂ is somewhat smaller than the ♀, perhaps not yet quite fully developed, otherwise agreeing very well with the ♀. Apical tergite evenly rounded (fig. 9). As may be seen from the figure, there are visible under it two processes similar to those described by Griffini for *knothae*. ♂ subgenital

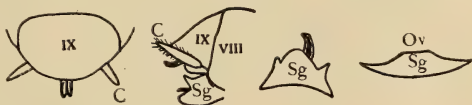


FIG. 9.—*Eremus chimaera*. From left to right: End of ♂ abdomen in dorsal and lateral view ; ♂ subgenital plate ; ♀ subgenital plate. Same magnification as fig. 7.

plate rounded-triangular, on either side near base bearing an acutely triangular, somewhat outwardly curved process which evidently represents a rudimentary style fully fused at base with the subgenital plate. Articulated inserted styles not present.

Eremus glomerinus var. *knothae* Griffini.

1908. Griffini (97), Atti Soc. It. Sci. Nat., xlvii, p. 6.

1911. Griffini (126), Boll. Mus. Zool. Anat. Torino, xxvi, 634, p. 17.

1911. Griffini (141), Mon. Zool. It., xxii, 5, p. 133.

1911. Griffini (143), Atti Soc. It. Sci. Nat., l, p. 242.

1 ♀ (det. Karny), Barberton, Transvaal, H. Edwards; 1 ♂ (det. Karny), Transvaal, Pilgrims Rest, L. Schunke.

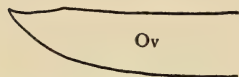


FIG. 10.—*Eremus glomerinus knothae*. Apex of ovipositor, of the same magnification as fig. 7.

A detailed description has already been given by Griffini; as an addition to this, I give here a figure of the very characteristic apex of the ovipositor (fig. 10).

Genus AMETROIDES Karny.

This genus is represented in South Africa by a single species only, viz. *peringueyi* (Griffini). For South West Africa there is to be added *namaqua* (Karny) (Jenaische Denkschr., xvi, Schultze, Forsch. Südaf., iv, p. 39, 1910). I have given a key to all the species of this genus known at present in Stett. Entom. Zeit., 1928. It is not represented in the material now before me, though Griffini has described *peringueyi* * from the material in the South African Museum, Cape Town.

SUBFAM. HENICINAE.

Key to the South African Genera of Henicinae.

1. Fore tibiae, besides the apical spines, furnished with 2 spines on upper inner side, unarmed above on outer side.
2. Hind femora heavy, basally scarcely thickened. Mandibles of ♂ not enlarged, shaped as in ♀. Frons and cheeks of ♂ without any processus. Ovipositor extraordinarily short, only 3 mm. long
 1. *Bochus* Péringuey.
- 2'. Ovipositor decidedly longer. Hind femora often thickened basally; if not so, frons or genae of the ♂ furnished with a processus.
3. Hind femora but little thickened basally. In the ♂ the upper part of frons produced into a blunt, obtuse cone, which is—though very slightly—also indicated in ♀.
 2. *Nasidius* Stål.
- 3'. Hind femora decidedly thickened basally and attenuated before apex (figs. 18, 22).
4. Frons and cheeks of ♂ without any processus
 4. *Onosandridus* Péringuey.
- 4'. Head of ♂ greatly enlarged, with a processus on either side above base of mandibles
 6. *Henicus* Gray.

* The ♀ type of this species, still placed under the genus *Eremus*, is present in the S.A. Museum collections but, having been overlooked, was unfortunately not forwarded to Dr. H. Karny for study.—EDITOR.

- 1'. Fore tibiae, besides the apical spines, with but 1 spine on upper inner side, unarmed above on outer side.
2. Hind femora heavy and relatively short, scarcely thickened basally
3. *Faku* Péringuey.
- 2'. Hind femora longer and stronger, strongly thickened basally, decidedly attenuated distally (figs. 18, 22).
3. Mandibles simple in both sexes. Fore tibiae without a tympanum
5. *Onosandrus* Stål.
- 3'. Mandibles of ♂ usually strongly enlarged; if not so, a distinct tympanum is present on either side of fore tibiae.
4. Mandibles and labrum of ♂ enlarged. Near base of mandibles an acute processus present in the ♂. Tympana of fore tibiae present or absent. Abdominal tergites smooth, shining.
5. Hind femora rather uniformly coloured, without any or with a not very striking pinnate marking outside; without a pale ring before the knee, the knee itself being usually pale above. The middle inner spur of hind tibiae about as long as or shorter than the metatarsus. The acute processus near the base of ♂ mandibles placed on the fore part of the genae, thus being separated from the mandible by the mandibular articulation
- comp. *Henicus* Gray.
- 5'. Hind knees outside very strikingly pinnate, pale and dark; further with a striking pale ring before the knee, the knee itself being blackish. The middle inner spur of hind tibiae about as long as the first three tarsal joints taken together. The acute processus in the ♂ placed on the mandibular base itself, thus not separated from it by an articulation or a suture
7. *Platysiagon* Brunner v. W.
- 4'. Labrum of ♂ never, mandibles rarely enlarged; near their base no processus. Fore tibiae always with a well-developed tympanum on either side.
5. Abdominal tergites rugulose-punctulate, strikingly roughened.
10. *Borborothis* Brunner v. W.
- 5'. Abdominal tergites smooth.
6. Mandibles simple in both sexes
8. *Libanasa* Walker.
- 6'. Mandibles of ♂ on median upper side produced into a cylindrical, upcurved processus, broad and thick at the base, sharply pointed at apex, and crossing each other near the tips
9. *Libanasidus* Péringuey.

I have not included in the preceding key the African genus *Dyscapna*, as it is as yet not known from South Africa, being represented by but

one species in Angola (*atra* Brunner v. W.) and one in the Tanganyika Territory (*pulchriventris* Griffini).

Gen. BOCHUS Péringuey.

Of this genus one species only is known at present, viz. *Bochus puncticeps* (Pictet and Saussure).

1891. Pictet and Saussure, Mitth. Schweiz. Entom. Ges., p. 297, pl. i, figs. 3, 3a (*Onosandrus*).

1916. Péringuey, *loc. cit.*, p. 419 (*contemnendus*).

1 ♂ (holotype of *contemnendus*), South Africa, 1875, E. Hughes; 1 ♂ (paratype of *contemnendus*); 1 ♀ (allotype of *contemnendus*), Smithfield, O.F.S., Kannemeyer, September 1910.

I have carefully compared Péringuey's types with the detailed description by Pictet and Saussure, and I find it agrees completely with them in every detail. The differences from the other *Onosandrus* species mentioned by Pictet and Saussure are more than sufficient to justify the erection of a separate genus. Péringuey (*loc. cit.*, p. 422) expressed the opinion that *puncticeps* should be placed with *Onosandridus*; but this is in contradiction with the shape of the hind femora, as may be seen from Pictet and Saussure's figure and from the following statements in the original description: "Pattes postérieures courtes; fémurs peu allongés, sans partie grêle à l'extrémité, fort peu renflés à la base."

Gen. NASIDIUS Stål (Péringuey, *nec* Brunner v. W.).

Key to the Species of Nasidius.

1. Shining black, but the antennae, ocellar spots, palpi, tarsi, and the spines of the legs ferruginous. Frons of ♂ obtusely produced basally near the insertion of the mandibles. Cheeks with dense longitudinal wrinkles. (Occurring in Angola) . . . (Genus ?) *costulatus* Brunner v. W.*
- 1'. Never shining black throughout. Frons of ♂ with a broad, obtuse, arched or conical elevation, simple in ♀.
2. Fore tibiae with a distinct tympanum on either side. Ovipositor about as long as hind femur . . . *Nasidius longicauda* nov. sp.
- 2'. Fore tibiae without any tympanum. Ovipositor decidedly shorter than the hind femora.
3. Body and legs ferruginous; face and abdominal dorsum more or less darkened . . . *Nasidius mimus* Péringuey.
- 3'. Body and legs shining black; head ferruginous with the face darkened . . . *Nasidius truncatifrons* Stål.

* I cannot decide from Brunner's short description under what genus *costulatus* should be placed, as I have not seen the type specimen. I have therefore included it in the species key of every genus to which it may possibly belong.

Nasidius longicauda nov. sp.

1 ♀ (type), Kaapmuiden, Transvaal, R. W. E. Tucker, 30th October 1918.

Measurements.—Width of head 10.5 mm., length of body 33.5 mm., of pronotum 9 mm., fore femur 9 mm., hind femur 24 mm., hind tibia 21.5 mm., ovipositor 21 mm.

Head castaneous, fastigium verticis somewhat darkened; ocellar dots distinct, yellowish, though very small; antennae dark brown, eyes yellow-grey. Frons, fore part of genae, clypeus, and labrum blackish brown, mandibles reddish brown with shining black chewing margins. Pronotum yellow-grey, diffusely darker greyish, nebulous, especially along fore margin; shining black along the whole hind margin, this band continued along lower margin of lateral lobes, becoming gradually wider and paler forwards, where it suddenly stops before the anterior angle. Posteriorly the whole dorsum bronzy black, but meso- and meta-notum slightly lighter laterally. Ventral surface blackish brown. Coxae yellowish brown, blackish brown, nebulous. Femora dark brown, becoming darker at the knees; tibiae and tarsi nearly black; the spines on the legs dark yellowish brown, blackish at the tips.

Head somewhat wider than pronotum. Fastigium of vertex fully twice as wide as first antennal joint, semicircularly rounded anteriorly, but in the median part continued into fastigium frontis without a distinct boundary. Frons, fore part of cheeks, and upper part of clypeus roughly covered with thimble-like punctures, the punctures becoming gradually smaller and scantier upwards and backwards on the cheeks. Frons rather strongly arched in the middle part, sloping downwards to the clypeus in a broad, obtuse-angulate, triangular area; it may thus be supposed that a frontal cone will be present in the ♂. Clypeus trapezoidal, with a strong median furrow in lower part. Labrum almost circular. Mandibles very strong.

Pronotum semicylindrical, somewhat dilated backwards and there about as wide as long; fore margin very slightly arcuate, hind margin transversely truncate. Disc without a distinct sculpture, with a very feeble, finely impressed median line and an uncertain indication of two transverse sulci running one behind the other in the anterior part; the 7-shaped furrow (of *Gryllacris*) too is indicated by an indistinct oblique impression. Lateral lobes nearly as high as long below; lower margin straight, somewhat descending backwards; anterior angle obtuse-angularly rounded, posterior angle almost rectangularly

rounded ; anterior margin somewhat oblique, posterior margin nearly vertical. V-shaped sulcus and hind oblique furrow feebly indicated, the former far removed from lower margin, transversely truncate below ; the hind oblique sulcus is also situated relatively far forwards. Prosternum quite unarmed. Mesosternal lobes almost rectangularly triangular, but more acuminate at apex. Metasternal lobes almost square, transversely truncate at the end, more rounded at the outer than at the inner angle.

Fore and middle coxae with a rather short, but strong and acutely pointed spinelet. All femora strongly compressed, unarmed ; the hind ones somewhat more thickened than in the allied species, but much less than in *Henicus* or *Onosandrus*, etc. All genicular lobes rounded, unarmed. Fore tibiae with a distinct tympanum on either side, unarmed above on outer side (excluding apical spines), with 2 spines on the inner side, the second of them being placed at about the middle. Middle tibiae above on outer side (=in front) with 2, on inner side with 3 spines (excluding apical spines). Hind tibiae straight, above on the outer side with 7, on the inner side with 8 spines which are about half as long as the tibia is thick, but the last one much smaller and situated just before the upper apical spur ; below on either side with the usual preapical spinelet before the lower apical spur, besides these with but 1 spinelet on inner side at about the middle, on the outer side with 3 spinelets from the middle to the apex. Middle inner spur strong, as long as the metatarsus, the upper one a very little longer, the undermost more than half as long as the middle ; upper and middle outer spurs hardly longer than the inner undermost, the lower outer spur shorter by about one-fourth.

Ovipositor long and slender, a little shorter than the hind femur, slightly upcurved, valvulae with complete margins, the upper ones decidedly longer than the lower ones, apex rather acute. ♀ subgenital plate with the shape of an obtuse-angled triangle, obtuse-angularly excised at the end, fully twice as wide at base as long.

The general appearance, size, and especially the coloration of pronotum reminds one very much of *Faku minotaurus*, but it is easily distinguishable from it by the darker head, the much longer ovipositor, and by the fore tibiae being two-spined above. By this latter character, the species comes under *Nasidius*, but cannot be mistaken for any of the other known species of this genus. The fact that *longicauda* possesses tympana on the fore tibiae is very remarkable, and gives to this species an exceptional systematic position, though it is not sufficient, I think, to separate it generically.

Nasidius truncatifrons Stål (nec Brunner v. W.).

Syn. : *monachus* Péringuey, *loc. cit.*, p. 417.

1 ♂ (type of *monachus*), between Zambesi and Limpopo, T. Ayres.

Apart from the smaller size, which I cannot consider as important (compare with *Henicus prodigiosus* and *Libanasidus vittatus*), the specimen before me agrees completely in all details with Stål's description of *truncatifrons*. Péringuey, when he stated that *truncatifrons* differs from his new species by having but one median spine above on fore tibiae, overlooked the fact that this is true only for *truncatifrons* Brunner v. W., whilst Stål expressly states for his species that it has 2 spines on the upper inner margin of fore tibiae (excl. apical spines). Brunner's species is, in my opinion, different from that of Stål, for (apart from the number of spines) the frontal cone is, according to the figure by Brunner, much more slender and acute (compare fig. 11 here with that given by Brunner), and the coloration is described by Brunner simply as "picea" without mentioning the striking difference between occiput and dorsum of body, which he could not have overlooked. I propose therefore a new name for Brunner's species and have placed it provisionally in the genus *Faku* (see *Faku brunneri*).

Péringuey seems to consider *mimus* as more closely allied with *truncatifrons* than *monachus*. Although the type locality of *mimus* would suit *truncatifrons* better than *monachus*, I must nevertheless identify the latter species with *truncatifrons* on account of their agreement in coloration. Moreover, the head is considerably broader in the ♂ of *mimus*, and Stål expressly states "caput . . . pronoto vix latius," a condition which agrees also with *monachus* and not with *mimus*.

I have few additions to make to the published descriptions: All genicular lobes unarmed. Middle tibiae with 2 reddish-brown spines above on outer side (=in front), 3 on inner side, below 4 such on either side (everywhere excluding apical spines). Hind tibiae with 8 shining black, brownish-tipped spines above on the inner side, 7 such on the outer side; below on either side with 1 brownish spinelet in the



FIG. 11.—*Nasidius truncatifrons* (type of *monachus*), dorsal view, natural size. (Del. Goesti Abdoelkadir.)

middle, and, besides these, 2 in the distal half on the outer side; further, the usual preapical spines just before the lower apical spurs. All apical spurs of hind tibiae blackish basally, brownish distally. The upper inner one scarcely as long as the metatarsus, the middle one a very little shorter, the undermost hardly two-thirds as long as the middle one. The upper outer spur about as long as the lower inner, the middle one a little shorter, the undermost somewhat shorter still.

Cerci well developed. Anal valves (appendices cerciferae) with a short, cylindrical, slender process directed upwards inside, the two crossing each other, almost completely covered by the subgenital plate. This latter large, hexagonal, somewhat broader at base than at the end, broadest a little before the middle, truncated squarely at apex, bearing at either angle of this apical margin a rather well-developed cylindrical style.

Nasidius minus Péringuey (*loc. cit.*, p. 416).

1 ♂ (type), Transkei, Dr. Kolbe, 1896; 1 ♀ (allotype), Kentani, H. P. Abernethy, 1907; 1 ♀ (det. Péringuey), Transkei, Kentani, 1899.

Easily distinguishable from the preceding species by the coloration and by the much broader head of ♂. Armature of legs as in that species, but there may be present exceptionally (♂ right leg) 8 spines above on the outer side of hind tibia. The spines of lower side of hind tibiae relatively longer than in *truncatifrons*; on the other hand, on the outer side, with the exclusion of preapical spines, there are always present 2 spines instead of 3. Apical spurs ferruginous, only blackish at the tips; their relative lengths as in *truncatifrons*, but the middle one of both sides not shorter, rather a little longer than the uppermost.

♂ sexual characters as in the preceding species, but the processes of anal valves longer, straight, horn-like, not crossing each other. ♂ subgenital plate slightly bisinuate at the end. Ovipositor very similar to that of the *ferox* type. ♀ subgenital plate rectangular in shape, slightly triangularly emarginate at apex, in the middle of its surface with a shallow triangular impression.

Gen. FAKU Péringuey.

Key to the Species of Faku.

1. Occiput at least, or occiput and pronotum, yellowish.
2. Body shining black above, occiput only yellowish ivory to pale ferruginous.
 ♀ subgenital plate small, trapezoidal, about as long as wide, slightly
 emarginate at apex *Faku dregii* (Burmeister).

- 2'. Occiput brownish yellow, pronotum yellowish grey, at most dilutely darkened along margins. Meso- and meta-notum and the abdominal tergites shining black, often somewhat greyish at their bases. ♀ subgenital plate obtuse-angularly triangular, much wider than long, with an obtuse-angled excision at apex *Faku minotaurus* nov. sp.
- 1'. Occiput dark, of a similar colour to rest of body on dorsum.
2. Pitchy coloured to shining black.
3. Frons above with a conical processus in the ♂.*
4. General colour pitchy brown. Frontal processus of ♂* rather slender, directed forwards and upwards, conical
Faku brunneri nov. sp.
- 4'. Bronzy black above, but the pronotum with a large, more or less distinct yellow spot on either side. Occiput dark brown, frons deep black. Frontal processus of ♂ very short, obtuse, and broad *Faku nigrifrons* nov. sp.
- 3'. Frons of ♂* without a median processus, bluntly produced basally near the base of mandibles. (Occurring in Angola.)
(Genus ?) *costulatus* Brunner.†
- 2'. Fuscous bronze sprinkled with pale flavescent *Faku minax* Péringuey.

Faku dregii (Burmeister). *N. dregii*

1927. Karny, Zeitschr. f. Naturwiss., lxxxviii, 1/2, p. 10 (*Mimnermus*).

The original description of this species given by Burmeister (Handb. Entom., ii, p. 721, 1838) runs as follows: "niger, nitidus, pedibus caesiis; capite ovato flavo, integro; clypeo labioque utrinque nigro. Long. corp. 1"-1½". Vom Vorgebirge der guten Hoffnung."

Since that time the species has not been redescribed, and it has also not been incorporated in Brunner's monograph. In 1927 I restudied Burmeister's type specimens, and added a few further remarks to his short description, but on that occasion I had very little time and space at my disposal to give a more detailed redescription of this species.

The measurements of Burmeister's types are :

	Width of head.	Length of body.	Mandib.	Pron.	Fore fem.	Hind fem.	Ovipos.
♂	mm. 10.1	mm. 39.0	mm. 6.0	mm. 7.6	mm. 8.0	mm. 19.3	mm. ..
♀	12.5	47.0	8.0	9.6	10.7	23.2	8.5

* The ♀ of *costulatus* is not yet known. Under *brunneri*, Brunner has placed a ♀ he described, but it is not quite certain whether it belongs in fact to this species.

† See the footnote to the species key of *Nasidius* above (p. 96).

At present I have before me the following material from which I now give a more detailed redescription of the species :—

2 ♂♂ (Brit. Mus., London), South Africa, C. G. Barrett, 1903-11; 1 ♀ (Mus., Cape Town), East London, May 1912, Loundale. Their measurements are :

	Width of head.	Length of body.	Mandib.	Pron.	Fore fem.	Hind fem.	Ovipos.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂	11.5	37.3	7.7	7.1	8.5	20.5	..
♂	11.0	±32.0	8.0	6.5	8.7	18.5	..
♀	9.3	32.8	6.0	8.2	9.6	21.6	7.5

Body deep black, with a strong metallic lustre, somewhat less intensively coloured in ♀; legs paler, grey. Head rather uniformly brownish yellow in ♀; in the ♂, occiput ivory yellow passing into castaneous downwards on frons. Face of ♂ dark castaneous brown to blackish brown, the lower part of genae straight on shining black; mandibles red-brown, black at the end; clypeus in the one ♂ ivory white, in the other blackish, but with a narrow whitish margin all round.

Fastigium verticis in ♀ hardly, in ♂ decidedly more than twice, as wide as first antennal joint (fig. 12); in ♀ concolorous, whilst pale greyish in the ♂; from its upper end, three longitudinal rows of very fine impressed punctures running on till the hind margin of occiput in the ♂, not distinguishable with certainty in ♀. Ocellar spots very small but distinct, brownish yellow. Structure of frons as in *minax*. Lateral region of frons and the greater part of cheeks furnished with strong wrinkles and raised ribs in the ♂, these being hardly visible even under the magnifying lens in ♀. Clypeus trapezoidal, much longer in ♂ than in ♀. Labrum almost circular. Mandibles of ♀ normal, fitting close to clypeus and labrum without any gap; in the ♂ elongate and very strongly curved, so that there remains a rather large gap between them and the clypeus. Labrum covering the apices of mandibles in the one ♂, whilst situated behind them in the other (as described already by Stål for *Nasidius*).

Pronotum relatively short, wider than long, decidedly dilated forwards in the ♂. Fore and hind margin transversely truncate. Besides the ascending branch of V-sulcus, which has the same situation as in *minax*, there are no other sulci distinguishable with certainty.

Lateral lobes hardly longer than high, similar in shape to those of *minax*. Prosternum unarmed. Mesosternal lobes acute-angulate, metasternal lobes obtuse-angulate (in *minax* apparently also of the same shape).

All femora unarmed, the hindermost slightly dilated basally, though much heavier and less strong and less attenuated distally than in *Onosandrus* or *Libanasa*. All genicular lobes rounded, spineless. Fore tibiae without any tympanum at all. Armature of tibiae as in *minax*, but one of the hind tibiae before me has 9 spines on the inner side above instead of 8. Apical spurs of hind tibiae more slender and relatively longer than in *minax*; the uppermost inside one fully as long

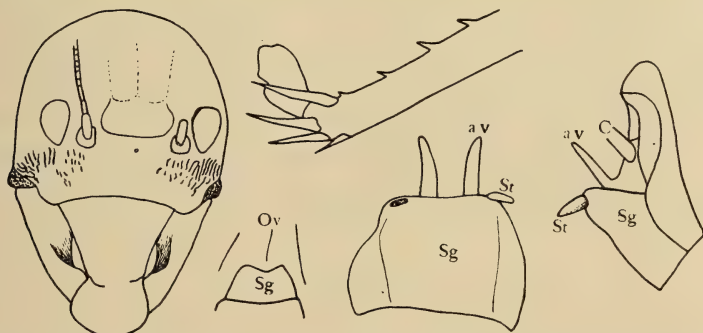


FIG. 12.—*Faku dregii*. Left: Head of ♂, frontal view. Middle above: ♂, end of hind tibia, seen from inside. Middle below: ♀ and ♂ subgenital plate. Right: end of ♂ abdomen in lateral view. The head less magnified than the other figures.

as metatarsus, the second one quite as long or even a very little longer, the third (=undermost) about two-thirds as long, the fourth (=pre-apical spine) much shorter and weaker; the outer two upper ones about equal in length, a little more than half as long as the inner ones, the third a little shorter, the fourth as inside one.

♂ subgenital plate large, trapezoidal, lateral parts obliquely ascending and separated from middle part by a very sharp longitudinal keel (fig. 12), middle part with the apical margin quite straight, transversely truncate, bearing a short, thick style on either lateral angle. Anal valves (=appendices cerciferae) transverse, extended mesad upwards into a long, cylindrical, almost straight, horn-like processus. Cerci but a little longer than this processus.

♀ subgenital plate very small, trapezoidal, about as long as wide at the tip, apical margin slightly emarginate, with a blunt rounded angle on either side. Ovipositor very weak and short, strongly directed

upwards even from the base, and also slightly upcurved for its whole length, with integer valves, blunt at apex.

Easily distinguishable from *minax* by the coloration alone; further, by the shape of ♂ mouth parts, by the wider fastigium of vertex, by the relative lengths of apical spines of hind tibiae, and, finally, by the structure of ♂ sexual characters. Differing from *brunneri* at a glance by the absence of ♂ frontal processus. I have already stated in 1927 that in my opinion *dregii* may perhaps be identical with *costulatus*. I have, however, not yet seen true specimens of *costulatus*, and thus know the species only from the very short description given by Brunner. From this I find that the only difference is in the coloration of the head, which is evidently not sufficient for a specific separation. On the other hand, Brunner's description is so laconic that not even the generic position of his species can be inferred from it with certainty. At all events, it is possible that the South African *dregii* may be represented in Angola by a similar, closely allied species, or by a local race somewhat different in coloration, which would then be *costulatus*. It seems impossible to decide these questions without having seen Brunner's type specimen (Mus., Stettin).

Faku minotaurus nov. sp.

1 ♂ (holotype), East London, Lightfoot, October 1912; 1 ♂ (paratype), Transkei, Kentani, Dr. Kolbe; 1 ♂ (paratype), Natal, Umvoti, H. Fry; 1 ♀ (allotype), East London, Lightfoot, November 1915.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ E.L.	13·2	44·0	9·5	10·7	23·5	20·0	..
♂ Tr.	12·5	33·5	8·7	9·5	22·8	20·4	..
♂ Nat.	10·5	31·7	7·7	8·7	19·8	16·7	..
♀	9·5	34·3	9·0	9·5	22·3	19·7	10·4

Occiput pale brownish yellow, laterally towards the genae gradually becoming red-brown. Face dark castaneous brown to blackish; mandibles sometimes paler, red-brown. Pronotum pale, greyish yellow, diffusely darker nebulous along margins, usually narrowly blackish, especially along hind margin. All following tergites bronzy black, but meso- and meta-notum yellow-grey in basal part, some of the

following tergites also somewhat paler basally. Under-surface of body yellow-brown to blackish. Legs yellow-brown to dark grey, tibiae darker than the femora.

Head wider than pronotum. Fastigium of vertex twice as wide as first antennal joint, slightly excavate on surface and with impressed punctures. Ocellar dots very small, dark yellow. Frons with a distinct, thick median elevation in ♂; in ♀ only arched, without a tubercle, though also obliquely descending against the clypeus in the shape of a very blunt, obtuse-angled triangle. Frons coarsely impresso-punctate, the punctuation becoming scantier and finer on clypeus and labrum; fore part of cheeks coarsely and irregularly wrinkled. Clypeus trapezoidal, usually longer and relatively narrower in ♂ than in ♀, in the ♂ from Natal shaped as in ♀. Mandibles of ♂ strongly curved, not closely fitting to clypeus and labrum but enclosing with them a distinct, though not very broad, free gaping space, at the apex covering and embracing the labrum in front in the ♂ type; in the two other specimens covered by the labrum.

Pronotum a little wider than long, slightly dilated forwards. Disc with a very fine median sulcus and three to four broad, very shallow, but slightly indicated cross-sulci, and with a feeble oblique impression at the site of the anterior end of 7-shaped sulcus. Lateral lobes a little longer than high, with almost straight, very slightly convex lower margin, the fore and hind angle being roundedly obtuse-angulate. The ascending branch of V-sulcus distinct, the descending branch slightly indicated; oblique hind sulcus usually not distinguishable at all. The soft-skinned throat bearing four shallow, circular, somewhat darker brown elevations, the two posterior ones somewhat larger and somewhat wider apart from each other than the two anterior ones. Prosternum with two acutely triangular points. Mesosternal lobes triangular, acutely pointed. Metasternal lobes inside more shallowly, outside more steeply obliquely truncate, with a rounded obtuse angle between them.

Fore and middle coxae each with a very short, triangular spinelet. Legs as in *dregii*; but the hind tibiae above always bear 8 spines on the outer side in the ♂, the last of them being, of course, very small; in ♀ only 7; on the inner side usually 8, though the number may increase to 10 or 11; the spines being decidedly less than half as long as the tibia is thick. Apical spurs of hind tibiae also as in *dregii*, but the middle inner spur may be a very little shorter than the uppermost; in the ♂ from Natal it is normal on the right hind tibia only, whilst on the left it is very short, decidedly shorter than the lower one, very

thin in distal half and with a very acute tip (evidently an abnormality, perhaps regeneration). A similar abnormality may be seen on left hind tibia of type-♂ in which the middle outer spur is very thick indeed, but quite short, almost tubercle-like, nevertheless with a distinct, blackish point; on the right hind tibia of the same specimen it is quite absent (perhaps broken).

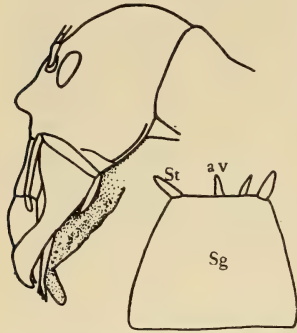


FIG. 13.—*Faku minotaurus*, ♂. Head in lateral view, and subgenital plate. Same magnifications as in fig. 12 (head less magnified than subgenital plate).

♂ sexual characters (fig. 13) similar to those of *dregii*. Ovipositor very broad in basal half and strongly upcurved, whilst narrow and rather straight in distal half, at the tip obliquely truncate from below. Valves complete, the lower ones decidedly shorter than the upper (compare fig. 14). ♀ subgenital plate similar to that of *nigrifrons*, of the shape of an obtuse-angled triangle, obtuse-angularly excised at apex, twice as wide at base as long.

Without doubt closely allied to *dregii*, differing from it in both sexes by the much paler, yellowish-grey pronotum; in ♂, moreover, by the presence of a frontal elevation and by the decidedly narrower fastigium verticis; in ♀ by the different shape of subgenital plate and ovipositor.

Faku brunneri nov. sp.

Syn. : *Nasidius truncatifrons* Brunner v. W., 1888, nec Stål 1876.

This species differs from the true *Nasidius* spp., not only by the number of fore tibial spines, but also by the ♂ frontal cone being (according to Brunner's figure) much slenderer and directed more upwards.

I place in this species, though with some doubt, 1 ♀ from Albany Dist.?, C.P., January 1891, Mrs. G. White.

Measurements.—Width of head 10.5 mm., length of body 35 mm., of pronotum 8.5 mm., fore femora 9.5 mm., hind femora 20.5 mm., hind tibiae 18.7 mm., ovipositor 9.4 mm.

In all structural characters agreeing very well with Brunner's statements. Upper surface of body (including occiput) dark brown, rather shining, going over into ferruginous laterally (including cheeks). Antennae uniformly ferruginous brown, but the first joint darker. Fastigium verticis, frons, and upper part of clypeus greyish black,

lower ocellar spot and a median spot between frons and clypeus ferruginous yellow, with the lower part of clypeus and the mandibles also of the same colour. Labrum darker again. Abdominal sternites dark brown, but on each sternite the hind margin and a rounded spot on either side ferruginous yellow. Ovipositor ferruginous brown. Femora dark ferruginous brown, all knees broadly shining black. All tibiae ferruginous brown below throughout their whole length, shining black above, but with a ferruginous ring below the knee, and all spines and spurs ferruginous yellow, blackish only at the tips.

Anterior part of genae and upper part of clypeus as strongly wrinkled as the frons. Femora and genicular lobes unarmed. Middle tibiae, besides the apical spines, with 2 spines above on the outer side and 3 on the inner side. Hind tibiae above on the outer side with 7, on the inner side with 8 spines, the last of them being very small and placed just before the upper apical spur; the others hardly half as long as the tibia is thick. Below 2 spinelets in distal part on the outer side, 1 on the inner side slightly beyond the middle, further on the usual preapical spines. Upper inner spur a very little longer than the middle one, almost as long as the metatarsus, the undermost about half as long. Outer spurs about two-thirds as long as the inner ones respectively, the undermost even slightly more. ♀ subgenital plate trapezoidal, more strongly narrowed distally, arcuately emarginate at apex. Preceding sternite with the hind margin slightly and uniformly convex, without any keels or depressions on surface.

Faku nigrifrons nov. sp.

1 ♂ (holotype), Mt. Frere, Transkei, Dr. S. L. du Toit; 1 ♀ (allotype), Brakkloof Farm, November 1897, Mrs. G. White, Albany Museum, Graham's Town.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♂	mm. 11.2	mm. 26.8	mm. 6.4	mm. 9.0	mm. 18.2	mm. 15.0	mm. ..
♀	10.6	36.0	8.2	10.3	19.7	18.0	9.5

General colour bronzy black, sprinkled with orange yellow in ♀ laterally and below. Occiput very dark brown, upper and posterior part of genae lighter brown. Eyes grey. Antennae dark brown.

Fastigium of vertex, frons, and lower anterior part of cheeks blackish. Clypeus becoming somewhat paler downwards, labrum darker again distally. Mandibles red-brown, blackish at the tip. Pronotum bronzy black; in ♀ there is present a large orange-yellow spot around the ascending branch of the V-sulcus, passing backwards below into several somewhat irregular smaller spots, and above emitting forwards a sharp point on disc, joined to the opposite one by two small transverse orange-yellow spots close before the middle of pronotum; just before hind margin another orange-yellow transverse median spot on disc. All these colorations are present in the ♂ too, but darker and much less well defined, so that they may be easily overlooked. Femora



FIG. 14.—*Faku nigrifrons*. Left: Head of ♂ in lateral view. Middle: ♂ subgenital plate. Right above: Ovipositor. Right below: ♀ subgenital plate. Same magnifications as in fig. 12 (head less than the others).

yellow-brown, with blackish reticulation, gradually darkened above and towards the knees. Tibiae and tarsi almost black. Spines of legs brown with dark tips. Ovipositor yellow-brown at base, becoming darker distally, but abruptly yellow-brown again before the tip.

Head in ♀ slightly, in ♂ decidedly wider than pronotum. Occiput strongly arched, especially in the ♂. Fastigium of vertex twice as wide as the first antennal joint, below arcuately rounded, surface excavate and impresso-punctate. Three dark yellow ocellar dots rather distinct. Fastigium frontis arched in ♀, whilst in the ♂ prominent downwards and thus passing over into a blunt, conical elevation, the tip of which is situated at about the middle of the frons; from here downwards the surface of frons slopes suddenly and strongly again towards the clypeus. Frons, clypeus, and labrum impresso-punctate, sides of frons and lower anterior part of cheeks even costulate, especially strongly so in the ♂; in ♀ these costules are also

distinguishable, but much weaker. Mandibles of ♂ very strongly arcuate, enclosing with clypeus and labrum a large, almost semi-circular gap (fig. 14); in ♀ slightly arcuate, but also not fitting close to clypeus and labrum, leaving between them a distinct though narrow space.

Pronotum somewhat wider than long in dorsal view, with well-indicated 7-shaped sulcus; moreover, with a broad valliform cross-sulcus behind fore margin in the ♂. Lateral lobes longer than high, with lower margin slightly rounded, almost straight, and with fore and hind angle roundedly obtuse-angulate. Ascending branch of V-sulcus strongly impressed. Prosternum with two flat, downwardly prominent lobes which are transversely truncate in ♂, acutely pointed in ♀. Mesosternal lobes broad, with a rather sharp, outwardly and backwardly directed point at apex. Metasternal lobes transversely truncate, with obtuse-angulate outer angle.

Fore and middle coxae with a short, acutely pointed spine. All femora compressed, unarmed. All genicular lobes rounded, spineless. Fore tibiae without tympana, above on the inner side with only 1 spine in the middle. Middle tibiae (besides the apical spines) above on the outer side with 2, on the inner side with 3 spines. Hind tibiae straight in both sexes, above on the outer side with 6 to 7, on the inner side with 8 short but sharply pointed spines, the last of them being much reduced, placed close before the upper apical spur. The other spines decidedly less than half as long as the tibia is thick. Below, besides the preapical spines, are 2 in distal half on the outer side, nearly as long as the upper ones, and with but a single one on the inner side at about the middle, decidedly shorter and weaker than the outer ones. Upper and middle inner spur about equally long, somewhat shorter than metatarsus; lower one about two-thirds as long as the middle spur. Upper and middle outer spur about as long as the inner undermost; lower outer one even somewhat shorter.

♂ subgenital plate large, trapezoidal, with well-developed styles; between them the hind margin is distinctly convex, but slightly emarginate in the middle (fig. 14). The horn-like processes of anal valves almost parallel, cylindrical, bluntly pointed at apex. ♀ subgenital plate and ovipositor practically as in *minotaurus* (fig. 14).

Without doubt this new species is very near to *minotaurus*, differing from it especially by the coloration of head and pronotum; in the ♂, moreover, by the mandibles being decidedly more arcuate, by the somewhat differently shaped frontal processus, and by the shape of the subgenital plate.

Faku minax Péringuey (*loc. cit.*, p. 419).

1 ♂ (type), Cape Colony, Dunbrody, J. A. O'Niel, 1901.

I can complete Péringuey's description by the following additions :—

Fastigium of vertex hardly twice as wide as first antennal joint, bluntly keeled laterally, rounded below. The two upper ocellar spots small, circular, pale, well defined, the undermost just as small, but much less distinct. The elevation on the frons (the "clypeus" of Péringuey) is very blunt and slight, defined on either side by a not very strongly marked, though distinct, subantennal pit, becoming gradually more shallow downwards and finally ceasing altogether. Frons obliquely truncate downwards towards the clypeus in the shape

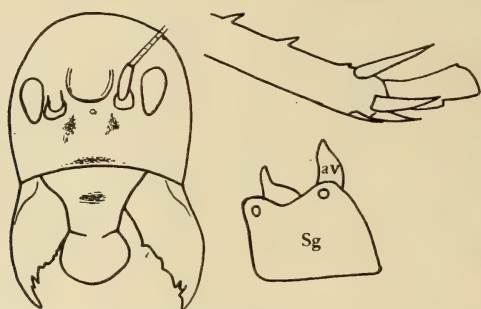


FIG. 15.—*Faku minax*, ♂. Left: Head in frontal view. Right above: End of hind tibia from inside. Right below: Subgenital plate. Same magnifications as in fig. 12 (head less magnified than the other figures).

of a broad, low triangle which is transversely slightly rugulose ("striolate," Péringuey). Mandibles short and broad, very heavy, in the unique type specimen widely separated (by preparation). In the normal position I suppose they will no doubt fit close to the clypeus and labrum without any free space between them.

Pronotum 7.7 mm. long, with fore and hind margins very slightly rounded, almost transversely truncate; fore and hind cross sulci broad and very shallow, separated from fore and hind margins respectively by about one-sixth to one-fifth of pronotal length. Lateral lobes longer than high, with very slightly rounded lower margin, somewhat obliquely ascending fore and hind margin; fore and hind angle bluntly obtuse-angulate. Ascending branch of V-sulcus situated about in the middle of lateral lobes, strongly and deeply impressed; no other sculpture distinguishable with certainty.

All femora unarmed; the hindermost a little more thickened basally than in *Bochus*, but the difference is not striking, and they certainly belong to the heavy type with only slight distal attenuation, quite different from *Onosandrus*, *Libanasa*, etc. All genicular lobes rounded, unspined. Fore tibiae without tympana at all; besides the apical spines, with but a single spine at the middle above on the inner side, below with 4 such on either side. Middle tibiae (excluding apical spines) with 2 spines on upper outer, with 3 on upper inner side, with 4 below on either side. Hind tibiae below with a very small spinelet at the middle on the inner side, with 2 such in distal half on the outer side; with 8 spines above on the inner side and 7 on the outer side somewhat larger than those below, decidedly shorter, however, than in the other allied species; the last of them, situated on either side just before the upper apical spur, is much smaller and weaker than the others. Besides the usual preapical spines on lower side, there are further 3 apical spurs on either side, the upper ones distant from the others; the inner uppermost the longest of all, but still not quite as long as the short, heavy metatarsus; the middle one somewhat shorter, and the lower one somewhat shorter again (fig. 15). Outer upper spur about two-thirds as long as the outer inner one; the middle and the undermost somewhat shorter, about equal in length to each other.

♂ subgenital plate roughly quadrate but somewhat narrowed distally, emarginate at apex. Styles not present in the specimen before me, though the places of insertion are easily distinguishable.

Without doubt a peculiar species, which was quite entitled to be separated generically from all the formerly known species. It is also very different from all the other species I have now provisionally placed in the genus *Faku*, differing especially by the shape of head and of ♂ mandibles. It is not impossible therefore that the genus *Faku*, as I have defined it here, may be a heterogenous one, and perhaps in the future will have to be restricted to *minax* only. Nevertheless, I wish to avoid the erection of a new generic name for the other species placed here under *Faku*, at any rate until their relations based on richer material have been definitely cleared up.

Gen. ONOSANDRIDUS Péringuey.

Key to the Species of Onosandridus and Henicus.

1. Shining black, but the antennae, ocellar spots, palpi, tarsi, and spines on legs ferruginous. Frons (♂) bluntly produced basally near the insertion of

mandibles. Cheeks with dense longitudinal wrinkles. (Occurring in Angola) (Genus ?) *costulatus* Brunner v. W.*

1'. Never shining black throughout, at least part of occiput or pronotum decidedly paler, yellow-brown or red-brown.

2. Legs dark brown to blackish.

3. Fore tibiae above on the inner side with but 1 spine besides the apical spurs, often with a distinct tympanum on either side. Body above strongly shining like varnish, abdomen shining black. Anterior part of genae above the base of mandibles in ♂ with a long, slender, horn-like processus reaching decidedly beyond the middle of labrum. Ovipositor almost as long as hind femora *Henicus pattersonii* (Stoll).

3'. Fore tibiae above on the inner side with 2 spines besides the apical ones, always without tympana. Body rather faintly shining.

4. Frons and cheeks rather light grey; labrum grey. Mandibles ochreous yellow. Ovipositor upcurved, about two-thirds as long as hind femora. ♀ subgenital plate small, trapezoidal, shallowly emarginate at apex

Onosandridus simplex nov. sp.

4'. Face fairly uniform brown. Ovipositor decidedly longer or shorter than in the preceding species. ♂ unknown.

5. Spines of hind tibiae fully as long as the tibia is thick.

Ovipositor by one-sixth shorter than hind femur.

♀ subgenital plate trapezoidal, transversely truncate or even slightly emarginate at apex

Onosandridus deceptor Péringuey.

5'. Spines of hind tibiae decidedly shorter than the tibia is thick. Ovipositor hardly more than half as long as hind femora. ♀ subgenital plate semicircular (fig. 16) *Onosandridus plebeius* Péringuey.

2'. Legs entirely or for the greater part brownish yellow or pale ferruginous.

3. Frons laterally and fastigium verticis dark reddish brown or black.

Middle of frons with a distinct pale yellow vertical band or at least with a pale yellow lower ocellar spot. Cheeks pale yellow.

4. Frons entirely black, only the pale yellow ocellar spot distinct, well defined. Middle tibiae above, besides the apical spurs, with 3 spines on either side

Onosandridus larvatus nov. sp.

4'. Frons from upper end of fastigium frontis to the similarly coloured pale yellow clypeus with a well-defined bright yellow median band, on either side thereof pitchy black. Middle tibiae, besides the apical spurs, above with 2 spines on the outer side and 3 on the inner side

Henicus pictifrons (Péringuey).

* Compare footnote to the species key of *Nasidiu*s above (p. 96).

3'. Frons fairly uniform brownish yellow to darker brown.

4. Castaneous brown. Thoracic tergites on either side with a sharp yellow band of spots. Fore part of genae in the ♂ with a short, broad processus, which is hardly longer than first antennal joint. ♀ unknown. (Occurring in Angola) . . . *Henicus cephalotes* (Bolivar).

4'. At least the head paler, brownish yellow to pale ferruginous. Thorax laterally without a well-defined band of spots.

5. Middle inner apical spur of hind tibiae twice as long as the uppermost *Onosandridus calcaratus* nov. sp.

5'. Middle inner apical spur of hind tibiae shorter or hardly longer than the uppermost.

6. Fore part of cheeks in the ♂ above base of mandibles with an acutely triangular, outwardly directed processus (fig. 19). Ovipositor hardly one-third as long as hind femur

Henicus prodigiosus (Stål).

6'. Anterior part of genae in the ♂ above base of mandibles with a cylindrical, forwardly directed processus (fig. 21). Ovipositor about as long as hind femora.

7. Middle tibiae above, besides the apical spurs, with 2 spines on the outer side and 3 on the inner side. Hind tibiae somewhat less strongly thickened basally.—♂: Head hardly twice as wide as pronotum. Mandibles uniformly and slightly curved.—♀: Lateral lobes of pronotum about twice as long as high, with slightly rounded lower margin. Subgenital plate (fig. 20) broad, rounded at apex. Ovipositor somewhat shorter

Henicus brevimucronatus Griffini.

7'. Middle tibiae above, besides the apical spurs, with 3 spines on either side. Hind femora somewhat more thickened basally.—♂ (fig. 21): Head more than three times as wide as pronotum. Mandibles at the end of basal fourth and at beginning of apical fourth obtuse-angularly curved inwards.—♀: Lateral lobes of pronotum but little longer than high, with strongly rounded lower margin. Subgenital plate (fig. 22) shaped as an equilateral triangle, but obtuse-angularly truncate at the apex. Ovipositor somewhat longer

Henicus monstrosus (Herbst.).

Onosandridus simplex nov. sp.

1 ♀ (holotype), 1 ♂ ?? (with damaged abdomen and but one middle femur and one hind leg, no fore legs), both from S.E. Tropical Africa, Manica, Coope, 1894.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♀	mm. 7.3	mm. 27.5	mm. ±6.0	mm. 7.2	mm. 16.5	mm. 14.0	mm. 10.5
♂ ??	7.7	28.0	5.8	?	16.7	14.2	..

Body very dark brown above, rather shining, uniformly coloured, but the occiput paler brown, fastigium of vertex darker brown again. Antennae uniformly dark brown. Cheeks and frons rather pale grey, fastigium frontis with a small, circular, dark yellow ocellar spot, well defined in ♂ ??, less distinct in ♀. Clypeus on upper part of the same colour as the front, then with an ill-defined darker cross-band, pale ferruginous yellow below. Mandibles—so far as they are not covered by the labrum—ochreous yellow. Labrum grey, darker than the mandibles. Legs paler than body, brown, paler than in *deceptor* and *plebeius*, but decidedly darker than in *pictifrons* and most of the other *Henicus* species. Ventrally brown, in the ♂ ?? almost as dark as above, in ♀ decidedly paler. Ovipositor yellow-brown.

Head not or hardly wider than pronotum. Fastigium verticis rounded, twice as wide as first antennal joint. Cheeks shining, with a few shallow, parallel, oblique impressions, hind margin with a linear prominence, but not enlarged. Mouth parts quite normal, without any enlargements or processes. Pronotum relatively small, wider than long in dorsal view, with a very slightly curved fore margin and transversely truncate hind margin. On the disc a relatively slender, finely impressed median line, and with the indication of two shallow cross-sulci, the hindermost of which is nearer to the hind margin than the anterior one is to the fore margin; fore sulcus curved, with the convexity directed backwards. Lateral lobes somewhat longer than high, fore and hind margins somewhat converging downwards, lower margin slightly curved, fore and hind angle rounded. The ascending branch of V-sulcus distinct, situated about in the middle of lateral lobes, the descending branch quite as far from fore margin as

from hind branch ; lower angle rounded, as far from the lower margin as the fore branch is from the fore margin. Hind oblique sulcus absent, but in this region there is present a small, rounded, decidedly impressed dimple. Fore and middle coxae with a distinct, short spine. Prosternum produced into two processes which are directed obliquely backwards and downwards, nearly lamellate, with the shape of an obtuse-angled triangle, but sharply pointed at tip. Mesosternal lobes of a similar shape, but larger and thicker, more massive, not lamellate. Metasternal lobes broad, slightly arcuate at the end, almost transversely truncate.

All femora unarmed, the hindermost strongly thickened basally, decidedly attenuate distally. All genicular lobes rounded, unarmed. Fore tibiae absolutely without tympana, unarmed above on the outer side, on the inner side with 2 spines besides the apical ones ; below with 4 spines on either side and the usual apical spines. Middle tibiae with 2 spines above on the outer side, 3 on the inner side, excluding the apical spurs, below as in the fore tibiae. Hind tibiae above on the inner side with 8, on the outer side with 7 spines, the last of them situated just before the upper apical spur and very small ; the others nearly as long as the tibia is thick ; below on the outer side in distal half with 3 spines and the usual preapical spinelet, on the inner side besides the latter unarmed. Upper and middle inner spur about equal in length, as long as the metatarsus, the undermost somewhat more than half as long. Upper and middle outer spur hardly longer than the lower inner one, lower outer spur somewhat shorter than the inner.

Ovipositor in length and shape between *deceptor* and *plebeius*. ♀ subgenital plate small, trapezoidal, slightly arcuately emarginate at the end. I do not know whether the other specimen is in fact a ♂, because the apical part of the abdomen is damaged.

Onosandridus deceptor Péringuey (*loc. cit.*, p. 422).

1 ♀ (type), S. Rhodesia, Umtali, Bodong, 1903.

Head brown. All genicular lobes spineless. Hind tibiae dark brown, spines of the same colour, otherwise as in *Henicus pictifrons*. Apical spurs of hind tibiae also as in that species. By the expression "styles long," Péringuey means the cerci. Ovipositor uniformly slightly upcurved, valves with complete margins, the lower ones decidedly shorter than the upper, apex bluntly pointed. ♀ subgenital plate of the shape of an equilateral triangle, slightly emarginate at the apex. Preceding sternite with a shallow median impression.

Onosandridus plebeius Péringuey (*loc. cit.*, p. 423).

1 ♀ (type), Transvaal, Hughes, 1878.

Hind femora very strongly thickened basally, unspined. Genicular lobes spineless. Hind tibiae very slightly curved in distal part, with 7 spines above on either side, the last of which is smaller than the others and situated just before upper apical spur. Middle inner spur of hind tibiae fully as long as the abbreviate metatarsus, the upper nearly as long, the undermost only about two-thirds of the middle one. Upper and middle outer spur a little longer than the lower inner one, the lower outer shorter. Valves of ovipositor with integer margins, the lower ones decidedly shorter than the upper. ♀ subgenital plate uniformly arched, almost semicircular, obtuse-angled at apex. Preceding sternite with a distinct, large, transverse pit which is bounded distally on either side by an ear-shaped process overlapping it from the hind margin (fig. 16).

Onosandridus larvatus nov. sp.

1 juv. ♂ (type), Cape Town, L.P., June 1885.

Though we have to do with a rather young specimen, all its characters are already so strongly marked that the species may be satisfactorily described from it. The measurements are to be considered, naturally, as of mere relative value, viz. :—

♂, width of head 4·8 mm., length of body 12·5 mm., of pronotum 3·2 mm., fore femora 4·3 mm., hind femora 11 mm., hind tibiae 9·7 mm.

Body uniformly dark brown above, almost blackish, but the occiput somewhat paler brown, and the lateral lobes of pronotum becoming gradually ferruginous backwards. Antennae brown, the two first joints pale yellowish, with a darker brown longitudinal stripe along inner side. Fastigium verticis, frons, and fore part of genae black. Lower ocellar dot distinct, circular, well defined, dark yellow. In addition, a similarly coloured, somewhat larger, but less well-defined spot is present from the inner angle of antennal scrobes towards the middle and downwards. Genae, except their foremost part, pale brownish yellow. The mouth parts of a similar colour, but the clypeus along the upper margin and lower part of labrum darkened. Legs pale brownish yellow. Fore and middle femora

gradually more or less darkened distally, hind femora somewhat darker above, but at knee itself decidedly pale above. Tibiae darker basally than distally, the colour gradually becoming paler. Whole ventral surface of body uniformly pale brownish yellow.

Head globose, decidedly wider than pronotum. Fastigium verticis not quite one and a half times as wide as first antennal joint. Frons, cheeks, and mandibles without any processes, the latter ♀-like, fitting close to clypeus and labrum, without any gaping space between them. Genae with a few shallow, parallel, oblique impressions, hind margin linear, but not lamellate. Pronotum somewhat compressed in middle part by the strong impression of the broad, not well-defined ascending branch of V-sulcus. Lateral lobes somewhat longer than high, with rounded hind margin. Fore and middle coxae with a short, sharp spine. Prosternum with two rather large tubercles side by side. Mesosternal lobes triangular, metasternal lobes slightly rounded.

All femora unarmed; the hindermost strongly thickened basally, attenuate distally. All genicular lobes spineless, rounded. Fore tibiae without tympana; except for the apical spines unarmed above on outer side, on the inner side with 2 spines, below with 4 spines on either side. Middle tibiae, except the apical spines, above with 3 spines on either side, with 4 below. Hind tibiae very feebly curve, above with 8 to 10 spines on either side which are scarcely half as long as the tibia is thick; below with a preapical spine on either side and, moreover, with 2 similar spinelets on the outer side in the distal half. The upper apical spurs strikingly far removed from the middle ones, hardly shorter than those. Middle inner spur a little shorter than metatarsus, the outer one only as long as metatarsus from base to the end of first pulvillus. Lower apical spurs hardly two-thirds as long as the middle ones, and also decidedly more slender.

♂ subgenital plate almost quadratic, truncate at the end, and with a slender style on either side which is almost as long as the subgenital plate. Surface with a blunt median keel, on either side of it a large, rather deep, darkened pit.

This species is very well characterised and cannot be mistaken for any one of the others. The armature of the middle tibiae distinguishes it at once from most of the other species and agrees with *Henicus monstrosus*. The coloration of hind knees also would fit *Henicus* better than *Onosandridus*, but as the type specimen is a ♂ and has no frontal processes like *Henicus*, it must be placed in *Onosandridus*.

Onosandridus calcaratus nov. sp.

1 ♀ (type), Beaufort West, Cape Colony, Dr. Purcell, 1905.

Measurements, ♀.—Width of head 5·3 mm., length of body 15·5 mm., of pronotum 5·0 mm., fore femora 5·2 mm., hind femora 10·3 mm., hind tibiae 9 mm., ovipositor 8·4 mm.

General colour brownish yellow, thoracic and abdominal tergites with blackish cross-bands along the hind margins.

Head not or hardly wider than pronotum. Occiput arched, with a sharp blackish stripe along each supraocular sulcus, and with an U-shaped black line between them slightly interrupted in the middle. Fastigium of vertex but little wider than first antennal joint, grey; on either hind angle there is present an outwardly directed, well-defined, whitish ocellar spotlet, and from here extends backwards a black longitudinal line ascending for a short distance on the vertex. Eyes grey. Antennae ferruginous, the two first joints paler, yellowish, with a dark spot on the inside. Lower ocellar spot well defined, whitish, acutely pointed above, and reaching here the lower margin of fastigium verticis. Frons and cheeks brownish yellow; below antennal base a large, not well-defined, nebulous, brownish-grey spot, and a similar one below each eye. Mandibles in the free part and clypeus above brownish yellow; clypeus below and labrum dark.

Pronotum somewhat darker than the remaining part of body, ferruginous, diffusely blackish along hind margin; almost quadratic in dorsal view, with a median sulcus nearly throughout its whole length. Otherwise there is no other sculpture distinguishable with certainty, except a large, shallow depression in the anterior part of lateral lobes. These about as long as high, with the lower margin slightly rounded, fore and hind angle obtuse-angularly rounded.

Fore and middle coxae with a short, tooth-like, sharply pointed spine, blackish at the tip. All femora spineless, uniformly coloured, except the knees which are narrowly and diffusely darkened. Hind femora shaped as in *Onosandrus tigrinus* (fig. 18). Fore tibiae without tympana, above on the inner side with 2 spines; middle tibiae above on the outer side with 2, on the inner side with 3 spines (excluding apical spines). Hind tibiae with 11 short spines above on either side; below, besides the usual preapical spines, with but a very small spinelet on the outer side at about the end of middle fifth. The middle inner spur somewhat longer than the metatarsus, the uppermost only about half as long, the lower one even shorter. Outside, the relative lengths of spurs practically the same, but all outer spurs

shorter than those inside, the middle one hardly three-fourths as long as metatarsus.

Cerci short and slender. Ovipositor very strongly upcurved in basal part, thence almost straight, sharply pointed at apex. ♀ subgenital plate (fig. 16) almost an equilateral triangle, rounded at the apex, and here with a weak median sulcus; before this, a horse-shoe-shaped carina, opening backwards, embracing a depression, and surrounded outside by some further depressions.



FIG. 16.—♀ subgenital plate of *Onosandridus plebeius* (left: magnification as in fig. 6) and *calcaratus* (right: magnification as in fig. 7).

This new species reminds one of the ♀♀ of *Henicus* (*monstrosus*, *brevimucronatus*) by the shape and colour of the head, but the length and shape of the ovipositor and the structure of the hind femora definitely exclude it from that genus according to my opinion. I therefore think it better to place it in *Onosandridus*, where it can be easily distinguished with certainty from all the hitherto known species. By the coloration, by the shape of the hind femora, and by the relative lengths of the apical spurs of the hind tibiae, it is strikingly similar to *Onosandrus tigrinus*, but differs from it by the fore tibiae being two-spined above, by the more slender form, by the shorter ovipositor, and by the different structure of the ♀ subgenital plate.

Gen. ONOSANDRUS Stål.

*Key to the African Species of Onosandrus.**

I have included in this key the species from the African continent only. Besides these, the genus is also represented in Madagascar and in New Zealand, and one species is supposed to have been recorded from India (! ?). These are not incorporated in the key below.

1. Fastigium verticis flattened or even almost excavate.
 2. Thoracic and abdominal tergites with distinct black bands along hind margins *Onosandrus bipinnatus* nov. sp.
 - 2'. Dorsal surface of body fairly uniformly coloured, without well-defined bands along hind margins.
 3. Lateral lobes of pronotum twice as long as high. Hind femora more slender (fig. 17) . . . *Onosandrus opacus* Brunner v. W.
 - 3'. Lateral lobes of pronotum hardly longer than high. Hind femora strongly thickened . . . *Onosandrus splendens* Sjöstedt.

* For the ♀♀ compare also the genus *Platysiagon* and the *Henicus* spp. *monstrosus*, *brevimucronatus*, and *pattersonii*.

- 1'. Fastigium of vertex arched.
 2. Hind femora with small spinelets below in distal half.
 3. Hind tibiae of ♂ decidedly curved. Ovipositor scarcely more than half as long as hind femur . *Onosandrus fasciatus* Stål.
 - 3'. Hind tibiae of ♂ straight. Ovipositor at least two-thirds as long as hind femora.
 4. Surface of body brownish yellow to castaneous; thoracic and abdominal tergites with blackish cross-bands along hind margins . . . *Onosandrus natalensis* nov. sp.
 - 4'. Surface of body uniformly blackish.
 5. Hind femora three times as long as pronotum. Hind tibiae above with 10 spines on the outer side, 8 on the inner side *Onosandrus fuscodorsalis* Sjöstedt.
 - 5'. Hind femora fully four times as long as pronotum. Hind tibiae above with 8 to 10 spines on the outer side, with 7 spines on the inner side
Onosandrus mediocris Péringuey.
 - 2'. Hind femora quite unarmed.
 3. Lateral lobes of pronotum as long as high. Middle inner spur of hind tibiae twice as long as the uppermost and decidedly longer than metatarsus.
 4. Hind margins of all tergites with well-defined blackish cross-bands. Ovipositor almost as long as or even longer than the hind femora. ♀ subgenital plate triangular, sharply pointed. Body heavier *Onosandrus tigrinus* nov. sp.
 - 4'. Hind margins of tergites not or hardly darkened. Ovipositor decidedly shorter than hind femur. ♀ subgenital plate rounded at apex *Onosandrus crassipes* Brunner v. W.
 - 3'. Lateral lobes of pronotum longer than high. Middle inner spur of hind tibiae as long as the uppermost, shorter than metatarsus
Onosandrus saussurei Brunner v. W.

Onosandrus bipinnatus nov. sp.

1 ♀ (type), Johannesburg, Dr. Purcell, 1905.

Measurements, ♀.—Width of head 5 mm., length of body 16·8 mm., of pronotum 5 mm., fore femora 4·6 mm., hind femora 13 mm., hind tibiae 11·3 mm., ovipositor 6·8 mm.

Pale ferruginous yellow. All thoracic and abdominal tergites with blackish cross-bands along the hind margins, decidedly wider on the three thoracic segments than on abdomen; pronotum also narrowly darkened along the fore margin. Head coloured like that of *Onosandridus calcaratus*, but the occiput without an U-shaped line; on the contrary, with a fine, sharp, pale yellow median sulcus running over the occiput and vertex to the base of fastigium verticis, where it

suddenly stops. Fastigium verticis almost one and a half times as wide as first antennal joint, flattened, and somewhat depressed in the middle; grey, transversely blackish along upper border, but emitting no black longitudinal lines backwards. Eyes black. Antennae brownish yellow, the basal joints also immaculate. Lower ocellar spotlet pale yellow, transversely truncate above, distinctly separated from the lower margin of fastigium verticis, produced downwards into a vertical band of the same colour which occupies fully half the height of frons. Cheeks pale yellow; frons of the same colour, but irregularly clouded with grey, especially so below the eyes. Mouth parts pale yellow throughout.

Pronotum ferruginous yellow, shaped as in *Onosandridus calcaratus*, blackish along fore and hind margin. No sculpture distinguishable with certainty, except a median sulcus running throughout the whole length of the disc, and a feebly indicated hind branch of V-sulcus about the middle of the lateral lobes. Fore and middle coxae with a rather short, acute tooth. Femora as in *Onosandridus calcaratus*. Fore tibiae absolutely without tympana, though somewhat depressed in this region, with but 1 long spine above on the inner side at the middle. Middle tibiae above with 2 spines on the outer side, with 3 on the inner side besides the apical ones. Hind tibiae above on the outer side with 7, on the inner side with 8 spinelets, below on the outer side with 2 such in distal half and the usual preapical spinelets. Middle inner spur as long as metatarsus, the uppermost but very little shorter, the lower one scarcely half as long. Upper outer spur about three-fourths as long as the inner one, middle outer slightly shorter, lower one hardly shorter than the inner undermost.

Ovipositor as in *Onosandridus calcaratus*, but blunt at tip. ♀ subgenital plate moderately large, trapezoidal, slightly emarginate at the apex; surface of this and of the preceding sternite without sculpture.

This species reminds one in general appearance, in coloration, and especially in its short, thick hind femora strongly of *Onosandridus calcaratus* and *Onosandrus tigrinus*, but differs from both by the relative lengths of the hind tibial apical spurs, by the shape of the ♀ subgenital plate, and also by the darkened fore margin of the pronotum; from *calcaratus*, moreover, by the armature of the fore tibiae, and from *tigrinus* by the much shorter ovipositor. According to the structure of the fastigium verticis, *bipinnatus* must be placed, not with the *crassipes* group, but near *opacus*. According to Brunner, this latter has the hind femora "uniseriatim pinnata" (compare the

following description), whereas they are bipinnate in *bipinnatus* just as in *tigrinus* (fig. 18).

Onosandrus opacus Brunner v. W.

I place the following specimens in this species :—

1 ♂, 1 ♀ (*Onosandrus saussurei*, det. Péringuey), Kalk Bay, J. H. Power, 1914 ; 2 juv. ♀♀, 1 juv. ♂, same locality and collector ; 1 very young ♂, Stellenbosch, Barnard, 1913.

The last specimen is too immature to be determined with certainty ; it may belong either to this or to another closely related species. The others without doubt all belong to the same species, though only the two first-named are mature enough to enable me to give a more detailed description. Their measurements are :

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♂	mm. 5·6	mm. 21·0	mm. 5·5	mm. 6·0	mm. 14·5	mm. 12·5	mm. ..
♀	5·0	20·5	5·0	5·5	14·5	12·8	11·5

Péringuey's identification of this species as *saussurei* is without doubt erroneous, for the fastigium verticis is decidedly flattened and even a little excavate on surface ; furthermore, in *saussurei* the ovipositor is slightly longer than the hind femora, whereas in these specimens before me it is decidedly shorter. According to Brunner's key, I have no doubt in referring them to *opacus*, and there is nothing in the original description that would be in conflict with this identification. It certainly is very short and says nothing on some of the important characters, so that an absolutely certain determination is not possible from it alone. Nevertheless, I think it very probable that the



FIG. 17.—*Onosandrus opacus*, ♂, lateral view, natural size. (Del. Goesti Abdoelkadir.)

Occiput and vertex arched, rather dark brown, with 2 to 3 longitudinal blackish lines and the sides strongly darkened. Fastigium verticis black, with an ovate or piriform outline, slightly wider than the first antennal joint ; surface slightly excavate and finely

impresso-punctate. All three ocellar dots present, dark yellow, the upper ones almost circular, directed outwards, the lower one larger, not well defined. Eyes brownish grey. The two first antennal joints pale brownish yellow, the first slightly darkened in the middle; following joints darker, brown. Frons and cheeks pale yellow, without a distinct sculpture, below the antennae and eyes with an ill-defined blackish-grey nebulous patch. Mouth parts brownish yellow, shaped in ♂ as in ♀.

Pronotum decidedly longer than wide, slightly dilated forwards, yellowish brown, with indistinct blackish lines on the disc, strongly darkened along the margins, but pale again near the fore angle of lateral lobes. No sculpture distinguishable with certainty. Lateral lobes about twice as long as high, fore and hind angle strongly rounded. Prosternum with 2 small tubercles. Mesosternal lobes produced into an acute, almost spine-like point. Metasternal lobes almost rectangularly triangular. Meso- and meta-notum and abdominal dorsum dark brown, but with a faded yellowish-brown median line, the colour of the segments often also slightly paler before hind margins, the margins themselves darker again. Ventral surface brownish yellow.

Fore and middle coxae with a sharply pointed, not very long spine. All femora unarmed, brownish yellow, decidedly paler above at the knees as in *Henicus monstrosus* and *brevimucronatus*; femoral surface with a more or less distinct blackish reticulation, distinguishable on the outer surface of hind femora either in the upper half only (unipinnate) or on lower half also (bipinnate); this character, to which Brunner called special attention, seems therefore to be of no specific value. Posterior (=inner) genicular lobes of middle and hind legs ending in a small, acutely pointed spine; the outermost of hind legs with a similar spinelet at lower margin before the middle. All tibiae basally darker than the femora, and there with a faded, yellowish, annular spot, distally gradually becoming paler brownish yellow in apical part. Fore tibiae with a slight impression on either side in tympanal region, without a tympanum on the outer surface, whilst there is one present in ♂ on the inner surface, but not distinguishable with certainty in ♀; above on the inner side with 1 spine slightly beyond the middle. Middle tibiae, besides the apical spines, above on the outer side (=cephalad) with 2, on the inner side (=caudad) with 3 spines. Hind tibiae straight, above on the outer side with 8 to 10, on the inner side with 9 to 10 spines which are about half as long as the tibia is thick; below, besides the preapical spines, 3 to 4 spinelets on the outer side and 1 on the inner side beyond the middle. The upper

apical spurs on either side rather distant from the middle ones. Middle inner spur as long as metatarsus from base to end of first pulvillus, the uppermost hardly longer, the undermost slightly more than half as long as the middle one. Relative lengths of the outer spurs similar to inner ones, the upper one about two-thirds as long as the upper inner one.

♂ subgenital plate semicylindrically arched, rounded at the end, brownish yellow, with well-developed reddish-brown styles. Processes of anal valves horn-like as usual, decidedly shorter than the cerci. Ovipositor decidedly, if only slightly, shorter than the hind femora, very slightly upcurved, rather pointed at apex; all the valves with integer margins and of equal length. ♀ subgenital plate small, bluntly triangular, almost semicircular.

Onosandrus splendens Sjöstedt.

1912. Sjöstedt, Ark. Zool., viii, No. 6, p. 17, pl. 3, fig. 1.

I only know this species from Sjöstedt's description and figure. It is not represented in the collection of the S.A. Museum. As may be seen from Sjöstedt's figure, it is more massive than *opacus*, the hind femora much more thickened basally, and the lateral lobes of pronotum relatively shorter and much higher. Thus it may easily be confounded with *opacus*.

Onosandrus fasciatus Stål.

Compare Sjöstedt, Ark. Zool., viii, No. 6, p. 18, pl. 3, fig. 2, 1912.

Not represented in the collection before me. It was always confounded with the following species until Sjöstedt pointed out the differences between them in the paper cited above.

Onosandrus natalensis nov. sp.

Syn.: *O. fasciatus* Brunner v. W., 1888, *nec* Stål, 1876.

Sjöstedt has pointed out that *fasciatus* Brunner v. W. cannot be identical with Stål's species. He supposed that the former might be synonymous with *fuscodorsalis*. There are, however, some differences to be mentioned: the legs of Brunner's species are shorter in proportion to the body than in *fuscodorsalis*, the ovipositor is relatively longer, and the colour also is not quite identical in both species. I therefore think it more prudent to keep Brunner's species separated provisionally, and here propose a new name for it.

1 ♂, Natal, Durban, purch. J. James, March 1888.

The specimen was already determinated as *Onosandrus fasciatus* (without any indication as to who determined it), probably from Brunner's monograph. The author of the determination apparently did not know at the time that *fasciatus* Brunner v. W. was not identical with *fasciatus* Stål, which Sjöstedt demonstrated in 1912. The abdomen of this specimen has been immoderately extended during preparation; for the rest, the measurements agree quite well with those given by Brunner. Lateral lobes of pronotum but little longer than high. Hind femora (fig. 18) much more slender than in *tigrinus* and *crassipes*. Hind tibiae quite straight, above on the outer side with 9, on the inner side with 7 spines, whereas in the other species there are usually more on the inner side than on the outer side. Upper and middle inner spur a little shorter than metatarsus. ♂ subgenital plate elongately trapezoidal, transversely truncate at the end; styles wanting in the specimen before me (probably broken off at base). Processes of anal valves as long as the cerci and decidedly wider than these, depressed, parallel-sided to beyond the middle, from whence they are attenuated to an acute point in apical third.

Onosandrus fuscodorsalis Sjöstedt.

1912. Sjöstedt, Ark. Zool., viii, No. 6, p. 19.

Not represented in the collection before me. I only know this species from Sjöstedt's description.

Onosandrus mediocris Péringuey (*loc. cit.*, p. 421).

1 ♂ (type), no locality label.

Distinguishable at a glance from the two most closely allied species, *natalensis* and *fuscodorsalis* (with the original descriptions of which I could only compare it and not with the type specimens), by the decidedly shorter pronotum.

Middle inner spur of hind tibiae as long as metatarsus along its upper edge, thus somewhat shorter than the average length of metatarsus; upper inner spur almost as long as the middle one. Upper and middle outer spur about equal in length to each other, two-thirds as long as the inner ones. Lower spur, on either side, not quite half as long as the middle one. Preapical spinelets very short and delicate, inconspicuous.

Onosandrus tigrinus nov. sp.

1 ♀ (type), Smithfield, O.F.S., Kannemeyer, "Orangia," 1910 (" *Onosandrus spec.*" in coll., without name of author of determination). 1 ♀ (det. Karny) ("♀ immatura sine tibiis anticis non determinanda," det. Griffini; further with a second label: "? *Onosandrus* vel *Carcinopsis*," without name of author of determination), Cape Colony, Hanover, 1901, Cron. Schreiner. 1 young ♀ (det. Karny), Smithfield, O.F.S., Kannemeyer, 1908; its ovipositor still very short, though already rather slender; bands of tergites easily distinguishable, but not yet as well defined as in the larger specimens.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♀	mm. 6.4	mm. 18.0	mm. 6.0	mm. 5.7	mm. 13.7	mm. 12.0	mm. 11.9
♀	6.5	15.5	5.3	?	11.7	10.5	13.3

At first I mistook this species for *crassipes*, with which it agrees well in most of its characters. Then I found amongst the material of the British Museum a true *crassipes* (♀) for comparison, and from this I have been convinced as to the specific difference of the two (compare key to the species).

All thoracic and abdominal tergites with well-defined black bands

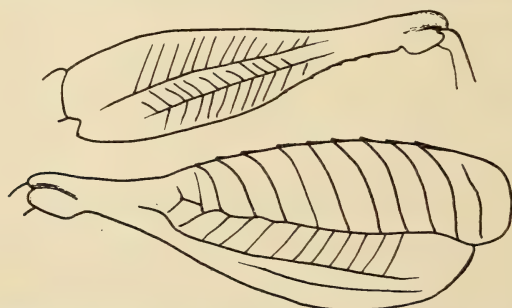


FIG. 18.—Hind femur (seen from outside) of *Onosandrus natalensis* (above) and *tigrinus* (below).

along hind margins, but even the pronotum without a fore marginal band. Fastigium verticis somewhat darkened, but the margins broadly pale yellowish. Face pale, with a distinct dark subocular spot. Tergites pale yellowish laterally and paler there than the

ferruginous dorsum; lateral lobes of pronotum with a dark middle spot. Fore and middle tibiae normally spined, the upper fore tibial spine being situated slightly basally from the middle. Hind tibiae above on the outer side with 11 to 12, on the inner side with 10 to 11 dark-tipped spines. Ovipositor about as long as hind femur, slender, uniformly slightly upcurved, rather pointed at apex. ♀ subgenital plate rather large, of the shape of an equilateral triangle, uniformly pointed at the tip, not blunt. All other characters as in *crassipes*.

Onosandrus crassipes Brunner v. W.

Not represented in the material of the South African Museum. For comparison I had before me a ♀ from the British Museum which certainly specifically differs from *tigrinus*.

Onosandrus saussurei Brunner v. W.

Not present in the collection now before me. Two specimens (♂, ♀) determined by Péringuey as *saussurei* I have placed with *opacus* (see above).

Gen. *HENICUS* Gray.

For key to species see *Onosandridus*.

I cannot regard Stål's *Mimnermus* as a different genus. It may be considered either as a synonym of *Henicus* or as a subgenus of it. In this latter case the genus *Henicus* should be divided into two subgenera as follows:—

Frontal processes of ♂ short, triangular or conical, sharply pointed at the end, more or less outwardly directed. Ovipositor hardly one-third as long as the hind femora subgen. *Mimnermus* Stål.

Frontal processes of ♂ cylindrical or horn-shaped, forwardly directed. Ovipositor not at all or but little shorter than the hind femora

subgen. *Henicus* Gray s. str.

Henicus (Mimnermus) pictifrons (Péringuey) (*loc. cit.*, p. 422).

1 juv. ♀ (type), Nylstroom District, Transvaal, A. Tucker, 1906.

This species has been described by Péringuey as *Onosandridus*. According to a ♂ specimen now before me in the material of the British Museum, it must, however, be placed in *Henicus (Mimnermus)* and is closely related to *prodigiosus*. I shall return to that specimen in another publication, and will only state here that the structure of

the head is practically the same as in *prodigiosus*, whereas the colour characters are quite as in the type ♀ and thus different from *prodigiosus*.

Colour of frons very characteristic for the species. Occiput and vertex with a narrow, well-defined, fine longitudinal sulcus, suddenly stopping at the base of the fastigium verticis and not extending on to it. Lateral lobes of pronotum broadly pale yellow along lower margin, black along fore and hind margin. Fore and middle femora just before the knee with a small black spot, the knees themselves being pale; hind knees almost entirely black. All genicular lobes spineless. Hind tibiae black above along both edges, but the spines pale; 8 on the inner side, 7 on the outer side, the last of them much smaller and weaker than the others, situated just before the upper apical spur; the others decidedly longer, stronger, and more acutely pointed than in *Onosandridus plebeius*. The upper inner spur of hind tibia slightly longer than the middle one, the latter as long as the first and second tarsal joint taken together; lower inner spur half as long as the middle one. Upper and middle outer spur as long as metatarsus along its upper edge; the undermost a little shorter, as long as that of inner side. All abdominal sternites pale yellow, with a black spot at base on each side. Ovipositor quite straight, acutely pointed, very short (larval).

Besides this type specimen I also place with this species 2 ♀♀ from Johannesburg, Cregoe, 1897; one of these specimens has a label "*Onosandrus pictifacies* sp.n." without the name of the author, and another one by Griffini: "spinae 2 superae tibiar. anticarum notandae, ut in *O. puncticeps* Pict. et Saussure, 1891 (gen. *Onosandrus* ???)."

The measurements of these two specimens (the second being that labelled as "*pictifacies*") are:

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♀	mm. 6·8	mm. 19·0	mm. 5·6	mm. 6·3	mm. 13·7	mm. 12·3	mm. 7·8
♀	7·2	20·0	5·8	6·5	13·9	11·8	8·0

Both specimens agree very well with the type in all morphological characters, but the middle inner spur of hind tibiae is as long as, or even a little longer than, the uppermost. The colour is more intense than in the type, especially the pronotum, which is more castaneous

brown. Face with similar markings as in the type, but in the first specimen (without a determination label) the pale vertical band on the frons is interrupted by a black cross-stripe close above the clypeus, thus connecting the black markings on the sides of the frons. In the other specimen (with Griffini's label) the markings on the face are as in the type, the black parts of the latter (fastigium verticis and sides of frons), however, being only castaneous in this case, passing into black only lower down at the base of the mandibles. For all the three specimens it is very typical that the lateral lobes of the pronotum are pale yellow below, especially towards the anterior angle, and that the meso- and meta-notum show a large, upright, yellowish spot laterally. As the sexual characters are not discernible in the (obviously still larval) type, I can only state that the ovipositor is shaped practically as in *Onosandridus plebeius*; ♀ subgenital plate very large, about one-fourth as long as ovipositor, shaped like an equilateral triangle, broadly rounded at the end, even slightly emarginate in the middle. Shape of hind femora the same in all the three specimens, practically as in *Onosandrus tigrinus* (fig. 18).

Henicus (Mimnermus) prodigiosus (Stål).

♂ = *Nasidius bechuanus* Péringuey, loc. cit., p. 416.

♀ = *Nasidius ferox* Péringuey, loc. cit., p. 417.

1 ♂ (type of *bechuanus*), Vryburg District, J. M. Bain. 1 ♀ (type of *ferox*), Zambesi, Matoppos, Pillans, also with the label ("verisim.: Gen. nov., apud Gen. *Platysiagona* Br. locandum, voir les 2 épines aux tib. anter. aussi chez *Onos. puncticeps* Pict. SSS. 1891," det. Griffini).

These two specimens have been described by Péringuey as two different species of *Nasidius*, but no specific differences can be gleaned from his species key as *ferox* is not included in it. From his descriptions too, and from the types now before me, I am unable to see any differences of specific value. On the contrary, the two specimens agree entirely with each other in all structural and colour characters, with the exception of the secondary sexual characters. - The only fact remaining is that the ♀ is considerably larger than the ♂. We must keep in mind, however, that such differences in the measurements—so far as they are not relative, but absolute only—are not very important in *Henicinae*, because we can very often (if the sexual characters are not already well developed) not make out with certainty whether we have to do with fully grown or larval specimens. In this connection I may recall Burmeister's two types of *dregii* (see above), which show quite as great differences in size as *bechuanus* and *ferox*.

Furthermore, it seems that the size varies according to the localities, and it is not improbable that the species becomes larger from Cape Colony (*bechuanus*) towards the tropics (*ferox*). Thus, I regard *bechuanus* and *ferox* as one and the same species, but they cannot belong to *Nasidius* at all, on account of the quite different structure of the ♂ head. Furthermore, the hind femora too are different from those of *Nasidius*, being decidedly stronger and more thickened basally. There is no doubt that all these characters hint at *Henicus*.

According to Brunner's key, *bechuanus* undoubtedly comes down to *Mimnermus prodigiosus*, and from Stål's rather detailed description I cannot find any difference between *bechuanus* and it, except that Stål characterises his *prodigiosus* by "dorso thoracis et abdominis nigricante," whereas in *bechuanus* and *ferox* all the tergites behind the pronotum are

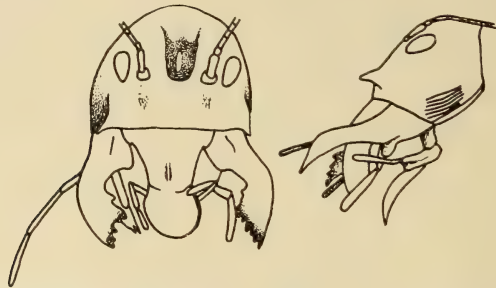


FIG. 19.—*Henicus* (*Mimnermus*) *prodigiosus*, ♂ (type of *bechuanus*).
Head in frontal and lateral view.

brownish yellow with blackish bands along hind margins. But if these bands were to become slightly broader and the tergites a little more telescoped, the yellow colour would disappear. I cannot therefore regard this single difference as important, and thus I place *bechuanus* and *ferox* as synonyms of *prodigiosus*.

I will complete the published descriptions by the following additions: The "median infuscate patch" mentioned by Péringuey is the somewhat darkened fastigium verticis of ♂; in ♀ it is scarcely darker than its surroundings. What Péringuey calls "clypeus" in the description of *bechuanus* is the frons, and his "labrum" is the clypeus! The latter is much longer and narrower in ♂ than in ♀, and bluntly obtuse-angularly produced basally on either side in both sexes. Pronotum semicylindrical, not "saddle-like," its disc entirely dark brown, but at the transition into the lateral lobes with a rounded, not very well-defined yellowish spot on either side in ♂, only very slightly and diffusely paler in this region in ♀. Lateral lobes a little

longer than high, with rounded angles, becoming gradually paler from the disc towards the lower margin, brownish yellow below. All femora and genicular lobes spineless. When giving the numbers of middle tibial spines, Péringuey did not include the apical spines, whereas in other cases he usually includes them like Brunner. Hind tibiae above on the outer side with 7, on the inner side with 7 to 9 (usually 8) spines, the last of them placed just before the upper apical spur and being much smaller than the others. The upper inner spur of hind tibiae about as long as metatarsus, the middle one even somewhat longer, the undermost only about half as long as the middle one. Upper and middle outer spur a very little longer than the lower inner; lower outer spur a little shorter. ♂ subgenital plate transversely truncate at apex, with rather well-developed styles. Anal valves above inside produced into a straight horn-shaped process as in *Faku dregii*; cerci slenderer and but little longer than these processes. Between the latter, the end of the supra-anal plate projects upwards and backwards as an acutely pointed, spine-like, triangular process. ♀ subgenital plate having the shape of an equilateral triangle broadly rounded at the end, with a fine median sulcus distally; its whole surface, together with the distal half of the preceding sternite, strongly wrinkled transversely.

Henicus pattersonii (Stoll).

This species was described by Stoll as “de gehoornde water-krekel,” probably only because he mistook the palpi for “Kieuwen.” Already, in 1839, Westwood opposed Stoll’s opinion with the words: “It is quite evident, from the saltatorial structure of the legs, and the impossibility of the insect executing a leap under water, from the natural resistance of the element, that there must be a mistake in the statement that it is aquatic in its habits.” However, in the literature nothing has thus far been made known as to the actual habits of this species.

1 ♂, 1 ♀ (det. Péringuey, *loc. cit.*, p. 418), Swellendam, L. E. Taylor, 1907.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂	10·3	23·3	6·5	8·8	21·4	18·7	..
♀	7·5	27·3	7·0	9·0	24·0	21·8	20·0

Differs from the other *Henicus* species at a glance by the much darker colour : body almost entirely shining black above, but the occiput and pronotum partially castaneous, the latter, however, at least along fore and hind margin, also black. The legs are also much darker than in the other species, and the hind knees in particular are not paler above. By the shape of head (♂) and the armature of legs it is nearer related to *brevimucronatus* than to any other species, but is also very well distinguished specifically from this species.

Genicular lobes of fore legs on either side, of middle legs on the outside, rounded, spineless ; inner lobes of middle and hind knees with a sharply pointed spinelet at apex, the outer genicular lobes of hind legs with a spinelet on the lower margin as in *brevimucronatus* (fig. 20). Fore tibiae in both specimens before me with a distinct tympanum on either side, above (besides the apical spines) with but a single spine on the inner side only slightly beyond the middle. Middle tibiae spined as in *brevimucronatus*. Hind tibiae with 10 spines above on either side which are more than half as long as the tibia is thick ; below in distal half with 3 spinelets on the outer side and 1 on the inner side ; further, the usual preapical spines. The middle inner spur scarcely shorter than metatarsus, the upper one somewhat shorter than the middle, the undermost only about one-third as long as the middle one. Upper and middle outer spur slightly more than half as long as the middle inner one, the undermost about as long as the inner.

♂ subgenital plate a little longer than wide, very obtuse-angularly emarginate (almost transversely truncate) at apex, with not very large styles. Ovipositor long and slender, slightly upcurved, very similar in shape to that of *brevimucronatus*. ♀ subgenital plate shaped like an equilateral triangle, but rounded at the apex ; preceding sternite transverse, without a distinct sculpture, except a very blunt median carina in distal part.

Henicus brevimucronatus Griffini.

1911. Griffini (146), Rev. Suisse Zool., xix, p. 494.

Syn. : *Henicus promontorii* Péringuey, loc. cit., p. 418.

Described by Griffini as a subspecies of *pattersonii*, but without doubt a well-separated species. I have compared Péringuey's type specimens of *promontorii* with the very detailed description of Griffini, and I find that they agree with it in every detail. Péringuey has apparently overlooked Griffini's paper. I have nothing of importance

to add to Griffini's description, but I may mention that the outer genicular lobes of hind femora are rounded at the end, bearing a distinct spinelet on the lower margin (fig. 20); the inner ones unarmed on lower margin, but produced at apex—as already pointed out by Griffini—into a rather strong spine (fig. 20). Griffini was cautious enough to place the female as questionably belonging to this species, but in fact there can be no doubt that it belongs here, its description agreeing completely with the ♀♀ of *promontorii*.

1 ♂ (type of *promontorii*), Cape, Cape Town, pres. August 1889; 1 ♂, 1 ♀, 1 juv. ♂, Newlands, H. M. Oakley, 10th June 1883; 1 ♀ (allotype of *promontorii*), Newlands, Purcell; 1 ♂, Cape Town, Tucker; 1 ♀, Cape Town, July 1880, Devil's Peak, Waterfall, C.L.-M.; 1 juv. ♂, Houw Hoek, W. F. Purcell, August 1900.

The last-named specimen was determined (probably by Péringuey) as *pattersonii*; but I must place it with *brevimucronatus* according to the armature and the colour of head.

All the specimens before me show on fore tibiae above on the inner side, besides the apical spines, but one spine slightly beyond the middle; on the right fore tibia only of Oakley's ♀ even this is absent. This right fore leg is without doubt a regenerate, being slightly shorter than normal, the tibia somewhat curved and more thickened distally than usual, the spines on lower edges much shorter than normal, beginning only beyond the middle; metatarsus with but one pulvillus, and the tarsal joints, on the whole, somewhat shorter than usual.

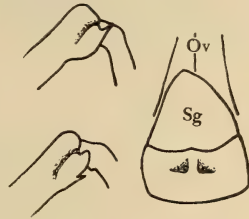


FIG. 20.—*Henicus brevimucronatus*. Left: Hind knee of ♂ (type of *promontorii*) seen from inside (above) and from outside (below). Right: ♀ subgenital plate. Magnification as in fig. 6.

Henicus monstrosus (Herbst.).

1 ♂, Cape Town, 1909; 1 ♂, Cape Town, H. Miller, 1906; 1 ♂, Cape Town, E. S. Pillans; 1 ♀, Cape Town, R. Trimen, 1878, R. Lightfoot, June 1885; 1 ♀ (det. Karny), Stellenbosch, L.P., 1897.

The ♂♂ (fig. 21) are recognisable at a glance by the extraordinarily characteristic shape of the head, and cannot be mistaken for any other species. The second ♂, as enumerated above, shows on both fore tibiae above on the inner side but one spine, the other specimens 2 (besides the apical spines). The number of spines is, therefore,

variable in this species. In the third ♂ enumerated above the head is conspicuously smaller than in the others, but still much broader than pronotum and otherwise too quite normally shaped. The fore

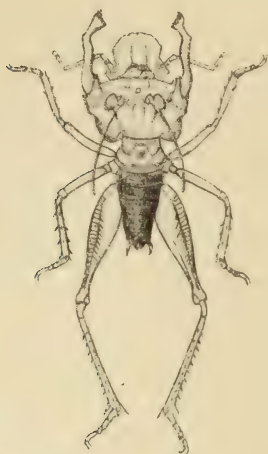


FIG. 21.—*Henicus monstrosus*, ♂, lateral and dorsal view, natural size. (Del. Goesti Abdoelkadir.)

tibiae have no tympana in the specimens before me, but in some of them a distinct depression is present at the site in question, though with no distinguishable tympanum. Genicular lobes of hind legs as in *brevimucronatus* (fig. 20), but the spinelets even somewhat weaker and smaller, the innermost hardly distinguishable with certainty.

Head ferruginous, fastigium verticis more or less blackish. Pronotum with a dark median spot and a rather broad transverse black band along fore and hind margins. Following tergites almost entirely black. Hind knees

strikingly pale above, whitish yellow.

The ♀ is very similar to that of *brevimucronatus* already described in detail by Griffini ((146), *loc. cit.*, p. 498), but its fastigium verticis a little wider than the first antennal joint, whereas in ♀ of *brevimucronatus* it is hardly as wide as this joint. Moreover, the number of middle tibial spines is a good character in both sexes and always

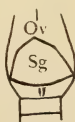


FIG. 22.—*Henicus monstrosus* (♀ 1878). Subgenital plate and hind femur. Magnification as in fig. 6 (and 18).

distinguishes *monstrosus* from *brevimucronatus*. Finally, I give here a figure (fig. 22) of the ♀ subgenital plate and preceding sternite (compare it with fig. 20 for *brevimucronatus*).

Henicus ? spec.

1 ♀ without hind legs and without label.

Though I have but little doubt that this specimen belongs to *Henicus* and represents a new species, I will not erect a new name for it because the hind legs are wanting and the ♂ is unknown, the systematic position thus being at present somewhat uncertain.

Width of head 6.8 mm., length of body 24 mm., of pronotum 5.8 mm., fore femora 6.7 mm., ovipositor 17.8 mm.

Occiput dark brown; hind part of genae paler, brownish yellow. Fastigium verticis and eyes blackish. Antennae pale yellowish, but the first joint with a dark longitudinal stripe inside. Lower ocellar spotlet brown, surrounded by a pale yellowish ring, and this latter surrounded by dark grey. Above this, on either side, a small, circular, pale yellow spotlet still on fastigium frontis. A larger spot of the same colour below the antennal scrobes. Otherwise the frons and fore part of cheeks are blackish grey, but gradually becoming paler towards the middle. Mouth parts pale, brownish yellow, especially the palpi, which are quite pale; clypeus close above lower margin, with a transverse blackish spot produced upwards as a fine line along either lateral margin. Labrum pale above and medially obliquely darkened on either side. Pronotum blackish brown, with some small, rounded, ferruginous spots on disc; lateral lobes for the greater part ferruginous, becoming still paler downwards. Meso- and meta-notum and abdominal dorsum uniformly brownish black. Ventral surface pale yellowish, and, continuous with it, a rounded spot of the same colour on either side of second and third abdominal tergites; on the following segments the pale colour ascending upwards to slightly beyond half the height of the tergites, well defined against the black colour of dorsum; the cerci too are of the same pale colour, the supra-anal plate, on the contrary, dark. Ovipositor ferruginous.

Head globose, somewhat wider than pronotum. Fastigium of vertex almost one and a half times as wide as first antennal joint, rounded, with a slight dimple-like depression on surface. Clypeus transversely trapezoidal, more than twice as wide above as below. Pronotum semicylindrical, almost square in dorsal view, without distinct sculpture; only the V-sulcus of lateral lobes clearly distinguishable, transversely truncate below, occupying the second third of the length of lateral lobes, extending downwards to scarcely beyond the middle; hind oblique sulcus slightly indicated, also

situated much more dorsally than in Gryllacrinae. Lateral lobes longer than high, lower margin slightly rounded, fore and hind angle bluntly obtuse-angular.

Femora and genicular lobes spineless (hind legs unknown!). Fore tibiae without tympana, spined below as usual, unarmed above on the outer side, above on the inner side (besides the apical spine) on left leg with 2, on the right with even 3 (!) spines. Middle tibiae spined as in *monstrosus*, but the right one above on the inner side with a supernumerary well-developed fourth (!) spine closer to the third than to the apical spine.

Ovipositor long and slender, with unbroken margins, slightly upcurved. ♀ subgenital plate as in *monstrosus*, preceding sternite as in *brevimucronatus*, but the two depressions and the median carina not extending so far forwards, restricted to the apical part of sternite, and also less strongly marked than in that species.

The colour characters are very striking and different from those of *brevimucronatus* and *monstrosus*. Armature of middle tibiae agreeing better with the latter species, but the greater number of spines on right fore and middle leg very curious. Ovipositor and ♀ subgenital plate more like those of *monstrosus*, preceding sternite again reminding one of *brevimucronatus*. There is no doubt that this specimen is specifically different from both.

Gen. PLATYSIAGON Brunner v. W.

Key to the Species of Platysiagon.

General colour darker. Hind tibiae above on the outer side with 14 to 15, on the inner side with 12 to 14 spines. ♂ mandibles produced in basal part of inner side into a short, broad, triangular process *Platysiagon signatus* Brunner v. W.

General colour paler. Hind tibiae above on the outer side with 9, on the inner side with 10 spines. ♂ mandibles produced basally inside into a long, horn-shaped process reaching almost to the end of mandibles

Platysiagon capicola Péringuey.

For ♀♀ compare also with the genus *Libanasa*. On the whole, it is quite possible that the one or other *Libanasa* species may be nothing else than a ♀ belonging to *Platysiagon*. This possibility is excluded only for *impicta* (which is closely related to *Onosandrus*, differing from it only by the presence of distinct tympana on fore tibiae) and for *Libanasidus vittatus*. According to Brunner's key, *Libanasa* (= *Carcinopsis* Brunner v. W. *partim*) and *Platysiagon* are distinguishable

only by the presence or absence of fore tibial tympana ; but as such are sometimes present in *Platysiagon* too, as is shown in the case of the two *signatus* specimens now before me, this character is useless, and there is thus no certain distinction between the ♀♀ of these two genera. Péringuey (*loc. cit.*, p. 425) states for *Libanasa* that "in both Brunner's species, which are, I believe, represented in the Museum collection, the head of the male is simple." This certainly would exclude an identification not only with *Libanasidus*, but also with *Platysiagon*. Péringuey, however, did not describe the specimens alluded to by him, so that it is not possible to make out with certainty whether he had in fact Brunner's species before him. The ♂♂ of them are not yet described, and they are not before me now.

Platysiagon signatus Brunner v. W.

Compare Péringuey, *loc. cit.*, p. 423.

1 ♂ (det. Karny), Beira, Mozambique ; 1 ♀ (det. Péringuey), Delagoa Bay, pres. L. Péringuey, August 1882.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♂	mm. 9.2	mm. 21.0	mm. 8.7	mm. 7.7	mm. 18.7	mm. 17.0	mm. ..
♀	6.5	23.5	9.5	7.5	20.5	18.8	15.6

Brunner mentions this species from Tabora as South-West African ("in Africa meridionali occidentali"); Péringuey, however, has already corrected this statement into "East Africa"; Tabora is situated in the Tanganyika Territory, thus even farther north than the localities of the two specimens now before me.

The four black clypeal spots mentioned by Brunner are very distinct in the ♂, absent in the ♀. Coloration of pronotum somewhat variable. In the ♂ the disc is castaneous brown, blackish laterally, lateral lobes in lower part yellow with a blackish spot ; the narrowed upper point of the yellow coloration extends upwards towards the disc as two yellow spots. In ♀ the pronotum is pitchy brown with a yellowish median line ; on the disc laterally a large yellowish spot shaped like an inverted U, reaching neither the fore nor the hind margin of disc, but the lower margin of lateral lobes, and enclosing in

its lower posterior part some dark spotlets. Abdominal dorsum with a diluted brownish-yellow median band in ♂.

All femora spineless. The inner (=posterior) genicular lobes of middle and hind legs with a very minute triangular spinelet at tip, the outer lobes of hind legs with an indication of a spinelet on lower margin, all the others unarmed. Fore tibiae in both specimens before me with a very distinct, large, partially blackish tympanum on either side; apart from the apical spines unarmed above on the outer side, with but one spine on the inner side somewhat before the middle. Middle tibiae, besides the apical spines, above on the outer side with 2, on the inner side with 3 spines. Hind tibiae above on the outer side with 14 to 15, on the inner side with 12 to 14 short spines shaped almost like the teeth of a saw, some of them alternately larger and smaller. Brunner did not state the number of spines, but from his figure it seems to be essentially less; thus I suppose he has not drawn in the smaller spines in the figure. Below, besides the pre-apical spinelets, 2 more spinelets on the outer side beyond the middle, exceptionally a further one at the end of basal third; on the inner side I cannot distinguish any spinelet at all. Middle inner spur as long as or longer than the first three tarsal joints taken together, the upper one not half as long, the lower still shorter. Outer spurs of the same relative lengths, but all three shorter, the middle one, however, longer than metatarsus.

Ovipositor slender and rather long, moderately upcurved, sharply pointed at tip; valves with unbroken margins, the upper ones longer than the undermost. ♀ subgenital plate small, shaped like an equilateral triangle, somewhat more sharply pointed at the apex.

Platysiagon capicola Péringuey (*loc. cit.*, p. 424).

1 ♂ (type), East London, 1898.

A very distinct species. Shape of ♂ head reminding one at a first glance very strongly of *Henicus pattersonii*, but the long horn is a process of the mandibular base, whereas in *pattersonii* it is situated above it at the anterior part of cheeks. The coloration too is different in both species. Péringuey's figures (pl. xlii, figs. 5, 5a) reproduce all the typical characters very well. The "labrum" of Péringuey is in fact the clypeus. Lateral lobes of pronotum longer than high, strongly rounded, the lower margin, however, somewhat less rounded than in Péringuey's figure. Meso- and meta-notum brownish yellow, with a darker cross-band along hind margin. Hind femora spineless,

spotted with dark in the lower half of outer surface, dark pinnate in the upper half, the brown stripes broader than the pale ones, then with a broad pale ring before the knee, the knee itself blackish, but the extreme apex pale again above. All genicular lobes unspined. Fore tibiae without any tympanum at all. Middle tibiae, besides the apical spines, with 2 spines on the outer side above, and with 3 on the inner side above. Hind tibiae above with 9 spines on the outer side, 10 on the inner side. Apical spurs very typical, the middle ones extremely long on both sides, the inner one about as long as the first three tarsal joints together, the outer decidedly longer than metatarsus, but not quite as long as the two basal joints together; upper apical spur on either side hardly half as long as the middle one, decidedly removed from it. Lower apical spur short on both sides, scarcely one-third as long as the middle one. ♂ subgenital plate almost quadrate, with slightly arcuated hind margin; styles very short and slender. Cerci short and weak, very strongly curved.

Gen. LIBANASA Walker.

Key to the Species of Libanasa and Libanasidus.

1. Hind knees decidedly darkened. Hind tibiae with 9 to 11 spines on either side. Middle inner spur of hind tibiae usually longer than the uppermost.
2. Middle inner spur of hind tibiae much longer than the upper, decidedly longer than metatarsus. ♂ unknown.
3. Ovipositor short, one-third as long as hind femur. (Occurring in East Africa : Dar-es-Salaam) . *Libanasa brachypura* Karny.
- 3'. Ovipositor long, two-thirds as long as hind femur
Libanasa incisa Walker.
- 2'. Middle inner spur of hind tibiae hardly longer than the upper one, as long as metatarsus.
3. Hind femora shaped as in *Onosandrus opacus* (fig. 17), decidedly more than twice as long as middle femora. Ovipositor decidedly shorter than hind femur. ♀ subgenital plate with S-curved lateral margins, hind margin broadly rounded and slightly emarginate in the middle . *Libanasa parvula* nov. sp.
- 3'. Hind femora strikingly short, at most twice as long as middle femora. Ovipositor almost as long as hind femur. ♀ subgenital plate triangular *Libanasa femoralis* (Brunner v. W.).
- 1'. Hind knees pale, but the condylus itself, and the furrow bounding the genicular lobes above, black. Hind tibiae with 7 to 8 spines on either side. Middle inner spur of hind tibiae not longer than the uppermost.
2. Mandibles of similar shape in both sexes, normal, simple. Thoracic and abdominal tergites darkened only diffusely along hind margins. Hind tibiae decidedly curved in the ♂, straight in ♀; their spines not quite half as long as the tibia is thick . *Libanasa impicta* (Stål).

- 2'. Mandibles of ♂ with a long, upcurved process before the end, crossing the opposite one before the tip. Thoracic and abdominal tergites each with a well-defined deep black cross-band along hind margin. Hind tibiae straight in the ♂, slightly S-curved basally in ♀; their spines fully as long as the tibia is thick

Libanasidus vittatus (Kirby).

Libanasa incisa Walker.

Compare the note under the genus *Platysiagon* above.

Not represented in the collection now before me.

Libanasa parvula nov. sp.

1 ♀ (type), Knysna, W. F. Purcell; 1 juv. ♂, Knysna, Purcell, 1896.

The ♂ is still in too immature a larval stage for me to describe. On the ♀ I give the following remarks:—

♀, width of head 3.5 mm., length of body 13 mm., of pronotum 3.8 mm., fore femora 4.5 mm., hind femora 12 mm., hind tibiae 10.5 mm., ovipositor 8.3 mm.

Uniformly pitchy brown above, brownish yellow underneath.

Head without any process in the ♂, shaped as in ♀. Occiput, eyes, frons, and cheeks uniformly pitchy brown, but the posterior part of genae somewhat paler. The first two antennal joints brownish yellow, the others wanting (broken off). Fastigium verticis somewhat wider than first antennal joint, convex, arcuately narrowed downwards. All three ocellar spotlets distinct, yellow, well defined, relatively rather large, the two upper ones circular, the undermost upright, ovate. Mouth parts brownish yellow, without any peculiarities.

Pronotum semicylindrical, somewhat longer than wide, no sculpture distinguishable with certainty, but in the middle of lateral lobes an almost vertical impression ascending somewhat obliquely backwards, corresponding to the hind branch of V-sulcus, reaching upwards to the sides of the disc. Some indistinct yellowish-brown spots in the region of this impression and on the disc. Lateral lobes fully one and a half times as long as high. Prosternum with two very blunt tubercles. Mesosternal lobes obtuse-angular, metasternal ones arcuately rounded at the end.

Fore and middle coxae each with a triangular tooth. Legs brownish yellow at base, becoming gradually darker distally, the knees and also the upper half of hind femoral outer surface dark brown; tibiae for the greater part dark brown, but before the end becoming pale yellow again; tarsi also pale yellow. Outer surface

of hind femora pinnately sculptured, more decidedly so in the upper than in the lower half, but the pinnae scarcely darkened. All femora unarmed. Hind femora strongly thickened in basal part, slender distally. All genicular lobes rounded, spineless. Fore tibiae on either side with a rather small tympanum, which is yet distinct under certain oblique lighting; above on inner side with one spine slightly beyond the middle. Middle tibiae (besides the apical spines) above with 2 spines on the outer side and with 3 on the inner side. Hind tibiae with 9 to 10 spines above on either side which are only about half as long as the tibia is thick. Upper apical spurs decidedly removed from the middle ones. Middle inner spur almost as long as metatarsus, the upper a very little shorter; the undermost not quite half as long as the middle one. Middle outer spur about two-thirds as long as the inner one, the upper outer hardly two-thirds as long as the middle, the undermost scarcely half as long as the uppermost.

Ovipositor by one-fourth shorter than hind femur, rather thick and straight in basal part, moderately upcurved distally, sharply pointed at apex; valves with complete margins, the lower ones somewhat shorter than the uppermost. ♀ subgenital plate rather large, about trapezoidal, a little wider at base than long, with slightly S-curved lateral margins, hind margin slightly rounded and very slightly emarginate in the middle.

Easily distinguishable from all the hitherto known species by means of the key above. If one should prefer to place it with *Onosandrus*, it would come between *crassipes* and *saussurei*, differing from both by the shape of ♀ subgenital plate and by the decidedly shorter ovipositor.

Libanasa femoralis (Brunner v. W.).

Not represented in the collection before me.

Libanasa impicta (Stål).

Syn.: *Onosandrus impictus* Stål, *Borborothis impicta* Kirby.

1 ♂, 1 ♀ (det. Karny), Cape Colony, Port St. John's, G. C. Shortridge.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♂	mm. 8.3	mm. 41.0	mm. 8.7	mm. 10.2	mm. 30.4	mm. 25.0	mm. ..
♀	9.0	37.3	10.0	11.4	33.8	30.4	±22.0

Since Stål's original description this species has not been studied again by anyone. Stål placed it (in 1876) with *Onosandrus*, with which it agrees very well in general appearance, but differs by the presence of distinct tympana on fore tibiae, as has already been stated by Stål. Brunner did not know this species, except from Stål's description, and placed it as a questionable synonym of his *Borborothis opaca*, which, I hold, is certainly erroneous. I cannot believe that such an observant author as Stål could have overlooked the coarse wrinkled sculpture of the abdominal tergites which is so typical in *Borborothis*; my opinion on this point is supported by the fact that the two specimens now before me agree very well in every respect with Stål's description and have the abdominal tergites quite smooth, thus belonging to *Libanasa*, not to *Borborothis*. Kirby quoted *impicta* as a different, good species of *Borborothis*. Otherwise I can find no reference to it elsewhere in literature.

The two specimens before me are coloured yellowish brown, having the thoracic and abdominal tergites diffusely darkened along hind margins, the pronotum along fore margin as well. General appearance very similar to *Libanasidus vittatus*, but the hind marginal bands much less distinct, and the mandibles simple also in the ♂. Fastigium of vertex about one and a half times as wide as first antennal joint, with a few dot-like impressions on surface. Hind femora strong, similarly shaped to those of *Onosandrus natalensis* (fig. 18); above with some very minute spinelets as in *Borborothis opaca*, though much smaller; below with some still smaller ones beyond the middle. Anterior genicular lobes and the middle outer ones rounded and unspined; inner genicular lobes of middle and hind legs each with a small, sharply pointed spine just before apex, the posterior outer ones with a sharp spinelet at lower margin before the middle. Fore tibiae with a distinct tympanum on either side; above, besides the apical spines, with one spine on the inner side, unarmed on the outer side. Middle tibiae above with 2 spines on the outer side and with 3 on the inner side, and the usual apical spines. Hind tibiae decidedly curved in ♂, straight in ♀, with 7 spines on either side above which are scarcely half as long as the tibia is thick, the last of them placed just before the upper apical spur; the row of spines beginning on the inner side further basally than on the outer side; below, besides the preapical spines, with but one spinelet on either side at about the middle. Apical spurs of hind tibia relatively thick; the upper inner one as long as or somewhat shorter than metatarsus, the middle one somewhat shorter than the uppermost, the undermost but

about half as long as the middle one. The outer spurs gradually decreasing in length from the upper to the lower spur, the uppermost but little more than half as long as the upper inner one.

♂ subgenital plate decidedly longer than broad, transversely truncate at apex; styles large, depressed, longitudinally excavate on lower surface. Horn-shaped processes of anal valves as in *Borborothis opaca*, but somewhat less divergent.

Ovipositor of the ♀ before me broken before apex, so that I cannot state its length exactly; in any case long and slender, slightly up-curved. ♀ subgenital plate of the shape of an equilateral triangle, but rounded at the apex and even slightly emarginate in the middle of hind margin, a fine median longitudinal keel running over its entire surface.

Gen. *LIBANASIDUS* Péringuey.

One species only, viz. :—

Libanasidus vittatus (Kirby).

Compare Péringuey, *loc. cit.*, p. 425.

1 ♂ (det. Péringuey), Barberton, H. de Beer, 1905; 1 juv. ♂, No. 49, 1 juv. ♀, No. 69 (det. Péringuey), Transvaal, Leydenburg Dist., T. Ayres, purch. 1879; 1 ♀ (det. Péringuey), Barberton, Kolbe, 1897; 1 ♀, Transvaal, Leydenburg, Krueger.

Anterior genicular lobes on either side and middle ones inside rounded, unarmed. Those of middle and hind legs inside (=caudad) each with a rather acute, blackish-tipped spine just before the rounded and somewhat inwardly curved apex. Outer lobes of hind knees rounded and spineless at the end, but at lower margin with a distinct spinelet just before the middle. Hind tibiae quite straight in ♂, slightly S-curved basally in ♀; above on either side with 8 (quite exceptionally 7 or 9) dark-tipped spines, the last of them situated just before the upper apical spur and very much reduced in size, so that it is sometimes hardly distinguishable even under the magnifying lens; the others long and slender, acutely pointed, fully as long as the tibia is thick; below on the inner side with but one spinelet in the middle and one just before the lower apical spur, on the outer side 2 (rarely 3) more such between them at about equal distances. Apical spurs long and slender, acutely pointed, the uppermost decidedly remote from the middle ones. The inner upper spur as long as or even somewhat longer than metatarsus, the middle one equally long or a little shorter. The undermost only about half as long as the

middle one. Outer spurs somewhat more than two-thirds as long as the inner respectively.

♂ cerci well developed. Anal valves quite similar to those of *Faku dregii* (see fig. 12). Subgenital plate almost quadrate, but narrowed distally, transversely truncate at apex; styles strong, more than half as long as subgenital plate.

Ovipositor rather blunt at apex, valves with complete margins, the undermost a little shorter than the upper ones. ♀ subgenital plate trapezoidal, as long as wide at base, not quite half as long at the apex as at the base, apical margin straight or slightly excavate.

The larval specimens agree with the fully grown ones in every respect, *i.e.* in colour, in shape of mandibles, in armature of legs, and in the sexual characters, thus being distinguishable from them by the smaller size only.

Gen. BORBOROTHIS Brunner v. W.

This genus differs from all the others at a glance by the strongly rugulose and punctate sculpture of the abdominal dorsum. Further, the spines of the hind tibiae are strikingly long. The presence of distinct tympana is also typical for but few other African genera besides *Borborothis*. As to the outline of fastigium verticis, I cannot state any certain and well-defined difference between *Borborothis* and *Libanasa*, though Brunner has placed them by means of this character in different groups; the surface of fastigium verticis, however, shows in *Borborothis* a slight vertical impression which is absent in *Libanasa*.

Key to the Species of *Borborothis*.

1. Inner genicular lobes of middle and hind legs just before the apex with a distinct, sharply pointed spinelet; outer lobes of hind knees with a similar one on lower margin *Borborothis brunneri* Bolivar.
- 1'. All genicular lobes rounded, unspined.
 2. Hind legs relatively more slender. Face reddish brown. Tibiae red-brown like femora *Borborothis opaca* Brunner v. W.
 - 2'. Hind legs relatively thicker and stronger. Face blackish. Tibiae dark brown, decidedly darker than the femora
Borborothis punctulata (Kirby).

Borborothis brunneri Bolivar.

- 1 ♂ (det. Karny), Coldstream, Humansdorp, 1912, L.P.; 1 juv.

specimen without abdominal apex (det. Karny). Cape Town, Lightfoot, February 1915.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.
♂	mm.	mm.	mm.	mm.	mm.	mm.
Juv.	6.5 5.0	25.3 ±16.0	7.0 4.7	8.0 6.2	19.5 15.0	18.5 13.7

These two specimens are very similar in general appearance to *opaca*, but come under *brunneri* by the distinctly spined genicular lobes (of middle legs inside and of hind legs on either side). Otherwise I cannot state any certain and well-defined difference from *opaca*. The above-named character is very distinctive and surely sufficient for specific separation. Hind tibiae with 8 spines above on either side, the longest of them being longer than the tibia is thick, moreover with one minute spinelet just before the upper apical spur. Middle inner spur not (juv.) or little (♂) shorter than the upper one. ♂ sexual characters practically as in *opaca*, but the horn-like processes of anal valves directed upwards beyond the end tergite are subcontiguous till apex, not gaping distally as far as in *opaca*.

Borborothis opaca Brunner v. W.

1 ♂, 1 ♀ (det. Karny), Oudebosch, Caledon, 1500 ft., K. H. Barnard, January 1919; 1 ♂ (det. Karny), Stellenbosch, L.P., 1887, with a label by an anonymous author: "*Onosandrus Saussurei* Wattenw."; and one by Griffini: "Remarquable aussi! Ayant des foramina aux tib. ant. ne pourrait etre *Onosandrus*, mais devrait se placer près du gen. *Aistus*"; 1 juv. (det. Karny), Stellenbosch, Barnard, 1913.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
♀	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂ Oud.	6.8	24.4	7.0	7.8	19.0	18.0	16.7
♂ St.	5.5	20.8	6.5	7.3	17.7	17.4	..
♂ St.	5.2	23.0	5.3	6.3	15.3	15.0	..
Juv.	4.0	13.7	4.0	4.6	10.5	10.8	..

There is no doubt that the specimens before me are specifically

different from those placed under the preceding species, as all their genicular lobes are rounded and quite spineless throughout. I take them also to be different from the specimens mentioned below as *punctulata*, though I am not quite certain in this latter respect. The hind legs are somewhat more slender than in those, where they agree

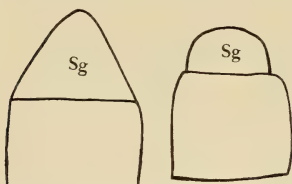


FIG. 23.—♀ subgenital plate of *Borborothis opaca* (left) and *punctulata* (right).

rather better with the figure given by Brunner. Nevertheless, I do not place those but the specimens enumerated above as *opaca*, and I do so for the reason that the length of the ovipositor agrees better with *opaca*, and the face is

not as strongly darkened as in *punctulata*. Middle tibiae in all the three species before me above with 2 spines on the outer side and 3 on the inner side, excluding the apical spines. Hind tibiae slightly S-curved in the ♂, possessing in either sex, besides the small spinelet just before the upper apical spur, further 6 to 8 (usually 7) spines on the outer side above and 7 to 8 (usually 8) on the inner side, which are decidedly longer than the tibia is thick; the row of spines below on the outer side already begins before the middle (as may be seen also from Brunner's figure), and the spines are better developed than is usual in other cases, though much smaller than those of the upper edges. Middle inner spur of hind tibiae hardly or but a little shorter than the uppermost; the difference by no means so great as in Brunner's figure. Sexual characters as described by Brunner; I here figure the ♀ subgenital plate (fig. 23).

Borborothis punctulata (Kirby).

This species has been described by Kirby as *Carcinopsis* and compared with *femoralis* and *fusca*—without doubt erroneously so. What Kirby states about the shape of the fastigium verticis and of the abdominal sculpture makes it certain that his species belongs to *Borborothis*. I have, however, seen Kirby's type specimens in the British Museum of Natural History, but at the time I had no other *Borborothis* before me for comparison, and I could therefore compare it only with *Libanasa* and *Libanasidus*. My notes are thus not sufficient for a certain definition of the species, and thus I have to fall back on Kirby's description. From this I cannot make out with certainty whether we really have to do with a good species different

from *opaca*. To *punctulata* I refer—with some doubt, however—the following two specimens of the material now before me :—

1 ♂, 1 ♀ (det. Karny), H. W. O., Rondebosch, C.P., 1883.

	Width of head.	Length of body.	Pron.	Fore fem.	Hind fem.	Hind tib.	Ovipos.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
♂	6.5	20.8	6.5	6.8	17.5	15.5	..
♀	7.4	26.2	7.8	7.5	18.2	17.3	11.7

Very similar to the *opaca* specimens before me, but decidedly more massive and with darker coloration. What Kirby means by the "two strong converging carinae" I cannot make out, unless these may perhaps be the two usual keels of the mandibular base. Genicular lobes all spineless as in *opaca*. The ♂ sexual characters do not show any striking difference from *opaca*. Ovipositor decidedly shorter and heavier than in *opaca*. ♀ subgenital plate (fig. 23) is also shorter and relatively broader; but I cannot state with certainty whether, in fact, we have here to do with a specific difference: it is not impossible that the unusual shape is but apparent through the subgenital plate having perhaps been somewhat telescoped under the preceding sternite.

SUBFAM. SCHIZODACTYLINAE.

Represented in Africa by one genus only, viz. :—

Gen. *COMICUS* Brunner v. W.

Only one species known at present in Africa :—

Comicus capensis Brunner v. W.

Four specimens now before me (det. Karny) with the following data: S.W. Africa, Otjituo, R. W. Tucker, January 1920 (the biggest specimen); Bushmanland, Jackals Water, C.P., Lightfoot; Kaross, S.W.A., Mus. Exped., February 1925 (two specimens).

Fore and middle tibiae very strongly tumescent, but quite spineless. First hind tarsal joint on either side with a slender styliiform process, and the apical spurs of hind tibiae also of the same shape (fig. 24).

By these characters the species is easily and with certainty distinguishable from *inexpectatus* (Asia Minor), which agrees in this respect with *Schizodactylus*, as has already been pointed out by Werner in his original description. Brunner's statement for



FIG. 24.—Dorsal view of left fore and hind tarsus of *Comicus capensis*.

capensis, "Tarsi omnes articulo primo tereti, gracillimo, in pedibus posticis medio spina longa armato," is probably due to a fault of observation or to an abnormality.

SUBFAM. RHAPHIDOPHORINAE.

Of this subfamily, too, only one genus is at present known from Africa, viz. :—

Gen. SPELEIACRIS Péringuey.

This genus is of extraordinary interest, as it is the only Rhaphidophorine from the whole of Africa (including Madagascar), and has up to the present not been studied by any author except Péringuey. Though he compared it in his description with *Dolichopoda*, he nevertheless placed it—curiously enough—among the Mimnermi, viz. between the genera *Faku* and *Onosandridus*. In general appearance it indeed resembles *Dolichopoda* very much, as may be seen from Péringuey's very good figure (*loc. cit.*, pl. xlii, fig. 1), but this of course conveys nothing with respect to the actual relationships. We find very similar types—as has already been pointed out by Scudder more than fifty years ago—in all parts of the world: *Dolichopoda* in Europe, *Diestrammena* in Eastern Asia, *Hadenoeus* in North America, and *Pleioplectron* in New Zealand, and these belong to quite different groups of Rhaphidophorinae, as I have just shown in a recent paper. We have to do here with convergent types of adaptation only.

As a matter of fact, *Speleiacris* is not at all closely related to

Dolichopoda. Its closest allies are to be found among the New Zealand species! This is also the case with *Onosandrus*, which is also represented in South Africa and in New Zealand. According to Brunner's key, *Speleiacris* should come between *Diestrammena* and *Neonetus*; in this position the South American genera *Heteromallus*, *Udenus*, and *Parudenus* (Falkland Islands) are excluded from comparison. In the key to the New Zealand species (Hutton, Trans. New Zeal. Inst., xxix, p. 224, 1897), *Speleiacris* should be placed close to *Pleioplectron* and *Neonetus*, agreeing in general appearance better with the former than with the latter. By the characters of the tibial armature, as used by Hutton, *Speleiacris* differs from both; for *Pleioplectron* has "fore and middle tibiae with two pairs of apical spines, of which the superior is much longer," whilst *Neonetus* is characterised by "fore tibiae with a pair of inferior, and middle tibiae with a pair of superior, apical spines." In *Speleiacris*, on the contrary, fore and middle tibiae show underneath only one pair of needle-like spines at apex, whilst there are above but two very minute spinelets scarcely distinguishable even under the microscope. In fact, the armature of the legs alone is sufficient to distinguish *Speleiacris* with certainty from all the other Rhabdophorine genera. As Péringuey has said very little about this character, I will discuss it here somewhat more in detail.

All femora spineless. Fore and middle genicular lobes on either side with a needle-like movable spine, which is equally long on both sides on the middle knees, whereas the inner one is somewhat shorter than the outer on the fore knees. Lobes of hind knees without movable spines, but the inner one produced into a rather sharp point at apex. Fore tibiae, just beyond the middle, with a pair of short movable spines below, but as these are easily broken off, they are still present in but few of the tibiae before me. On the middle tibiae I cannot distinguish any such spines at all. Apex of fore and middle tibiae as described above. Hind tibiae set above almost throughout their whole length with two rows of very minute, closely set spinelets, some of them being longer than the others (fig. 25); below very densely haired, so that I cannot state whether there are minute spinelets among the hairs or not. Upper apical spur of hind tibiae more than half as long as metatarsus (fig. 25), the inner one somewhat longer than the outer; middle apical spur hardly one-third as long as the uppermost, the undermost still shorter and weaker. Metatarsus and second tarsal joint of hind legs very densely haired throughout the whole length (not indicated in my figure), but apparently without

any spines, except two sharply pointed apical ones, situated side by side close to each other and directed straight backwards.

The armature of the metatarsus excludes from comparison all the genera of the Northern Hemisphere and places the genus without any doubt with the Macropathini. Among these, *Pleiopectron* and *Neonetus* only could be mistaken for *Speleiacris*, but they differ by

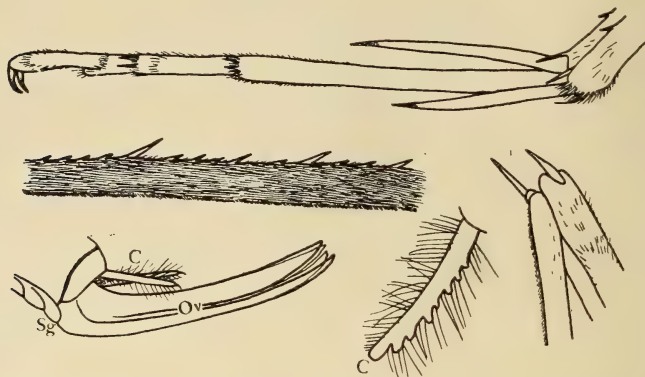


FIG. 25.—*Speleiacris tabulae* (types). Above: Hind tarsus, seen obliquely from above. Middle: Middle part of hind tibia. Right below: Middle knee. Below middle: Left ♂ cercus in dorsal view. Left below: Ovipositor. The two last figures less magnified than the others, and the last still less than the preceding.

the number and arrangement of the apical spines of fore and middle tibiae, as has already been pointed out above.

Of this genus only one species is at present known, viz. :

Speleiacris tabulae Péringuey.*

1 ♂ (type), Table Mountain, K. H. Barnard ; 1 ♂ (paratype), Table Mountain, Grottoes, F. Werts, 1909 ; 1 ♀ (allotype), Cape Town, Table Mountain, in cave 100 ft. below surface, R. Marloth, December 1900 ; 1 ♀ (paratype), Table Mountain, K. H. Barnard.

Not only is the armature of the legs (as described above for the genus) very remarkable, but also the sexual characters. These have already been described by Péringuey in some detail. The ♂ cerci are striking at a glance by the lobes, shaped like the teeth of a saw, along their inner edges, which I figure again somewhat more enlarged

* See additional notes by Dr. A. J. Hesse, p. 273.

(fig. 25) than in Péringuey's figure. I do not know of any other genus with a similar structure, which I regard as a rudiment of a previous segmentation (compare *Lezina* and *Pristoceuthophilus*). Styles hanging down backwards and being somewhat arcuate with the convexity upwards and backwards. Cerci of ♀ simple, without any lobes like those of the ♂, but ending in a sharp spine-like point at apex. Ovipositor (fig. 25) somewhat upcurved at base and near apex, but perfectly straight in between; valves with integer margins, acutely pointed at the tip, the upper ones hardly longer than the undermost. ♀ subgenital plate transversely truncate at the end and slightly triangularly excised in the middle of hind margin. Preceding sternites each bearing two slightly convex areas of semi-elliptical outline, transversely truncate anteriorly and strongly rounded posteriorly, very well defined all round, occupying almost the whole length, and together almost the whole width of the respective ventral plates.



4. *New South African Solifugae*.—By R. F. LAWRENCE, B.A., Ph.D.,
Assistant in Charge of Arachnida.

(With 18 Text-figures.)

THE following paper consists of descriptions of new species found among unidentified material in the Museum's collection, which has accumulated over a number of years and has been taken in various parts of South Africa. It reveals the fact that the rich fauna of the south-western districts, and especially its distribution, is not by any means completely known; the fact that three new species of *Solpuga* and one of *Blossia* have been found to inhabit the higher mountain ranges of the Cape, most of them taken above 4000 feet, points to the existence of a peculiar and interesting Solifugid fauna which is limited in distribution to the higher altitudes of the Cape geological system. The distribution of certain known species on the other hand, such as *Solpuga vineta* and *Solpuga fusca*, is wider than at first supposed. Another region which is as yet insufficiently known and which would repay more detailed exploration is that formed by the coast-line strip from Malmesbury northwards to the Orange River.

This paper contributes, as new to the Solifugid fauna, seven species of *Solpuga*, one of *Zeriassa*, four of *Blossia*, and one of *Melanoblossia*; a number of records, some of which are new, have been added.

Gen. SOLPUGA, Licht.

Solpuga antelopicornis, n. sp.

(Text-fig. 1.)

1843. 4 ♂♂, Great Winterhoek Mountains, 5000 feet.

Colour.—Headplate black, mandibles above and laterally in the upper half black, remainder yellow; legs and palpi black, except femur and tibia of palp below and apical segments of legs 2-4 below, which are brown; tergites of abdomen blackish brown clothed with mixed black and brown hairs, the sides deep violet to black, a band of whitish hairs on each side of the tergites; sternites yellow in the middle, blackish at the sides (the last 1-2 segments altogether black),

covered with yellowish silky hairs; malleoli sharply edged with black.

Dentition.—Outer series as in fig. 1, *a*, seen from the outer side; inner series consisting of 3 teeth decreasing successively in size posteriorly, the space separating the first from the second considerably greater than that separating the second from the third. Lower

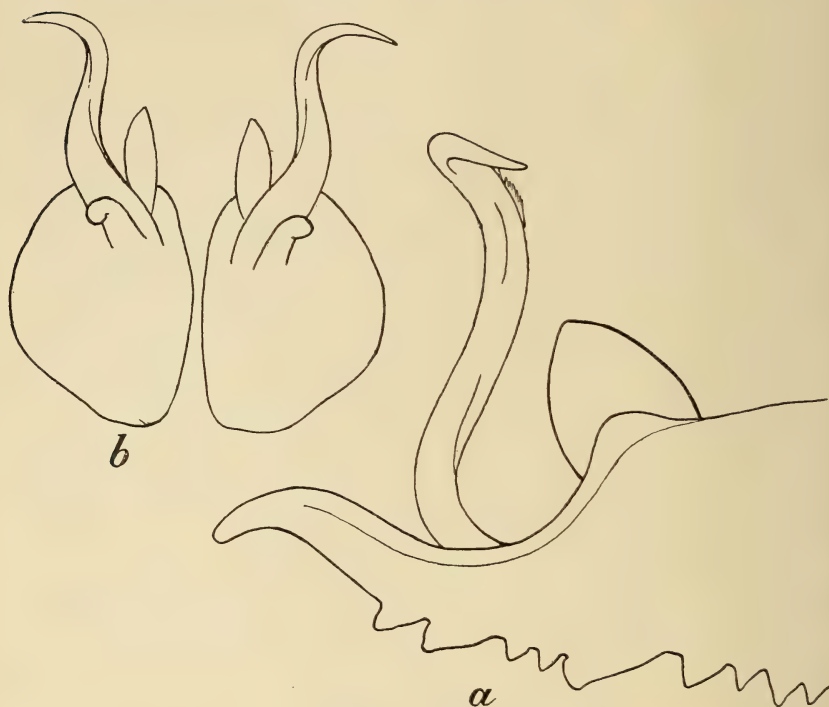


FIG. 1.—*Solpuga antelopicornis*, n. sp.

jaw with anterior main tooth separated from the higher posterior main tooth by two intermediate teeth which are nearer to the posterior than to the anterior tooth; the anterior of the intermediate teeth is the smaller of the two and has just in front of it a small, hardly perceptible granule.

Flagellum seen from the outer side (fig. 1, *a*) describes four curves, one near the base forwards, then slightly backwards, thirdly again forwards, and finally sharply backwards; at the termination of the third bend there is a short series of serrations which is not continued on the fourth bend; the flagellum finally ends in a simple point

(in one specimen the point is broken off bluntly near the tip in both jaws). Seen from directly in front (fig. 1, *b*) the flagellum curves outwards from its basal commencement, is then more or less perpendicular, and lastly curves strongly outwards describing almost a semicircle, resembling in its general appearance the horns of some of the antelopes, especially *Tragelaphus*; seen from in front the flagellum is narrowed regularly towards the apex, while seen from the side its width is uniform throughout except in the narrowed terminal bend. The general axis of the flagellum is directed more or less at right angles to the horizontal axis of the mandible; in one specimen, however, its axis is directed more backwards, and here the series of small serrations commences lower down at about the middle of the third bend.

Stridulatory ridges eight in number.

Spination.—Sides of the head thickly covered with short, sharp, whitish spines, first thoracic segment with a posterior collar of similar spines, headplate with a few long, erect, brown setae; tibia below with 5-5 setae and cylinder bristles, metatarsus with long setae, cylinder bristles, and an oval scopular patch below occupying its length except basal and apical extremities; posterior legs without a mane.

Other specimens:

1844.	1♂,	4100 feet,	Great Winterhoek Mountains.
1842.	1♂,	4500	„ „ „ „
1839.	1♂,	4000	„ „ „ „
1840.	1♂,	4500	„ „ „ „
1841.	1♂,	4700	„ „ „ „
1837.	1♂,	5000	„ „ „ „
1845.	3♂♂,	4300	„ „ „ „

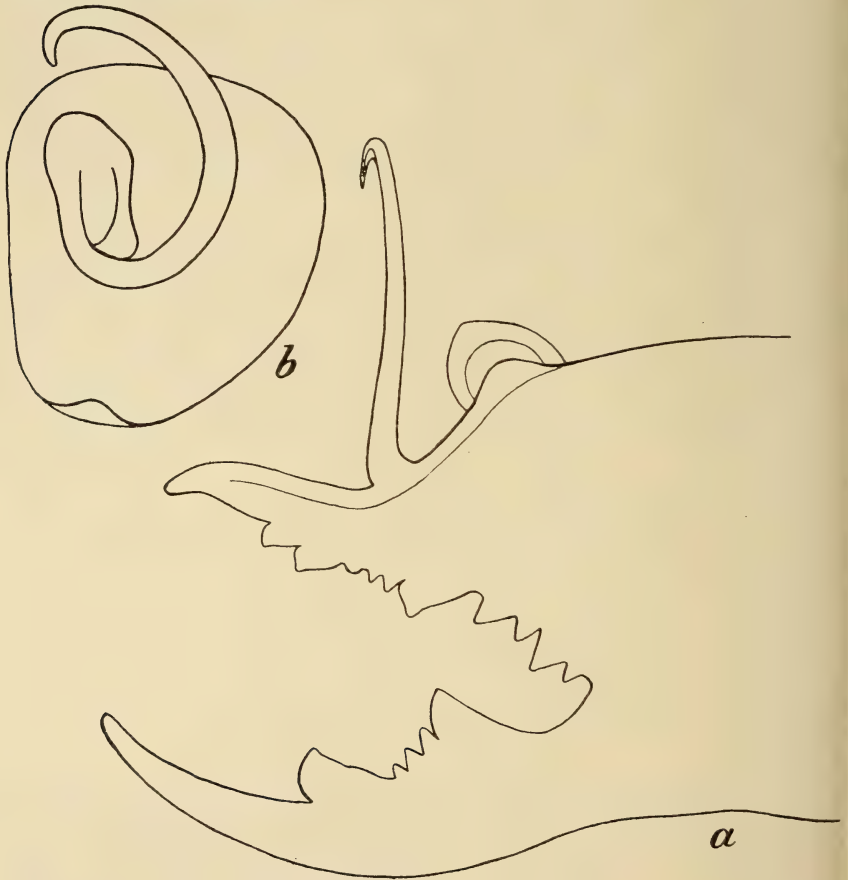
The females of this species have up to the present not been taken; the males seem to have a limited distribution at an altitude of above 4000 feet and have only been taken on these mountains; in a few individuals there is a slight variation in the amount of outward curvature of the flagellum when seen from in front, but otherwise all show conformity to the type.

Measurements of largest specimen. Width of headplate 4·3, length 3·3, length of detached mandible 4·9, tibia 4·7, tarsus+metatarsus 4·7, total length 21·9 mm.

Solpuga bovicornis, n. sp.

(Text-fig. 2.)

1 ♂, 1866, Matroosberg Mountains, Hex River.

Closely resembling *S. antelopicornis*, differing in the shape of the flagellum and the dentition.FIG. 2.—*Solpuga bovicornis*, n. sp.

Colour as in *S. antelopicornis*, the dorsal lateral white bands not contrasting so noticeably with the dark central band.

Dentition.—Outer series of upper jaw seen from the outer side (fig. 2, *a*) resembling that of *S. antelopicornis* except that there are three small teeth between the two main anterior teeth and the third

main tooth, the first of these three intermediate teeth being either low and rounded or else toothlike and resembling the two succeeding teeth and smaller than them. Inner series as in *S. antelopicornis*.

Lower jaw as in fig. 2, *a*, with three teeth between the two main teeth, the first of which instead of being an obsolete granule as in *S. antelopicornis* is a distinct tooth; the anterior main tooth notched in the middle.

Flagellum quite different in shape to that of *S. antilopicornis*; seen from the outer side (fig. 2, *a*) it is perpendicular to the main axis of the jaw, slightly curved and slightly tapering distally; the terminal portion is bent round inwardly and slightly forwards, there are no serrations; seen from in front and a little above (fig. 2, *b*, remaining structures of the jaw not shown), the flagellum curves downwards, then outwards, and finally inwards and downwards, the whole rather resembling in outline the shape of the human ear; the width is more or less uniform except in its distal portion which is slightly tapering.

Stridulatory ridges 6-7.

Spination as in *S. antelopicornis*.

Measurements.—Breadth of headplate 4.2, length 3.2, length of mandible 4.7, tibia 4.3, tarsus + metatarsus 4.8, total length 21.2 mm.

Solpuga montana, n. sp.

(Text-fig. 3.)

1 ♂, 1874, Matroosberg Mountains.

Closely related to *S. maraisi*, Hewitt.

♂. *Colour*.—Headplate and appendages brown with a reddish tinge, abdomen with a median brown band above, darker along its lateral margins, sparsely clothed with light brown hair; sides blackish brown, thickly clothed with greyish-yellow hair; ventral surface yellow-brown, a reddish-brown stripe at each side composed of a spot in each segment, last two segments black.

Dentition seen from inner side (fig. 3, *a*) as in *S. maraisi* with minor differences, the tooth between the flagellum and fang apex on the upper surface of the dorsal jaw here replaced by a short keel which is surmounted by a little tooth at its commencement.

Flagellum reaching to only half-way between the basal enlargement and ocular tubercle; seen from the side, the anterior bend occurs farther back than in *S. maraisi*, its width tapers gradually to the point of bifurcation where it divides into a lower blunt portion and an upper slender portion with serrations as shown in enlarged figure

of the tip of the flagellum (fig. 3, *b*) ; seen from above, the flagellum is a little wider than the mandible at its anterior bend and tapers

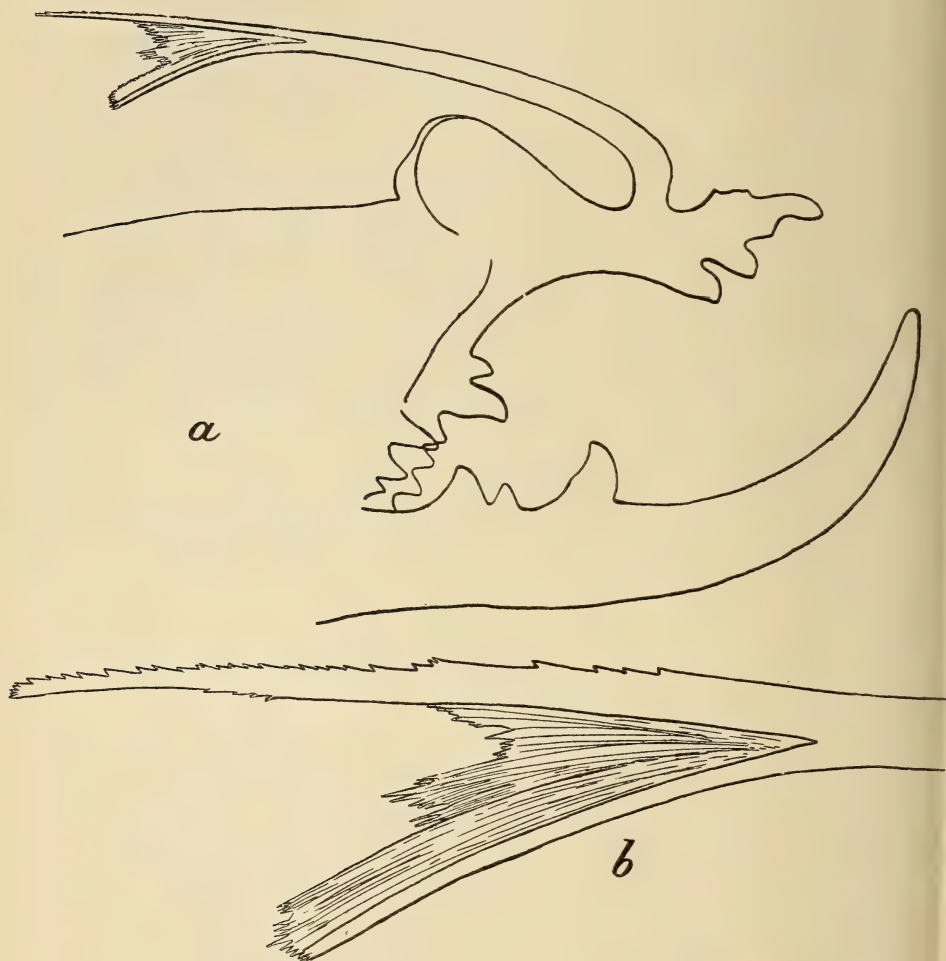


FIG. 3.—*Solpuga montana*, n. sp.

regularly to the apex ; the axis of flagellum from above is parallel to the longitudinal axis of the jaw or directed slightly inwards.

Posterior legs clothed with yellow silky hairs but not forming a mane.

Mandibles with 8 sinuously curved stridulatory ridges.

Palp.—Metatarsus below scopulate along its length except in basal fifth.

Measurements.—Length of mandible 7·5, width of headplate 5·5, length 4·6, tibia 6·8, tarsus+metatarsus 7·9, total length 31·5 mm.

2 ♀♀, 1867, Matroosberg Mountains, 4000–5000 feet.

♀. *Colour* in general similar to that of the ♂; tibia and metatarsus of fourth leg, tarsus of palp darker, tergites a little darker than the rest of abdomen, infuscated laterally forming two narrowly converging stripes, last three tergites blackish throughout; sides clothed with yellowish silky hairs; sternites infuscated laterally forming two posteriorly meeting stripes, these much farther apart than the dorsal stripes.

Dentition.—Outer series of upper jaw with two main anterior teeth, the second slightly larger than the first, then a small intermediate tooth and close to this a third large main tooth, then 4 moderate teeth, the first and third larger than the second and fourth; inner series consisting of 3 teeth, the first large, the second moderate, the third minute, the second nearer to the third than to the first; lower jaw powerful, the distance between the fang-tip and the first tooth much less than in the ♂, one intermediate tooth.

Posterior legs with long silky hairs as in the ♂.

Measurements of ♀.—Length of mandible 6·9, width of headplate 5, length 4, tibia 4·5, tarsus+metatarsus 5·5, total length 25 mm.

Other specimens:

1871. 1♂,	4000 feet, Matroosberg Mountains.
1869. 2♂♂,	” ” ” ”
1873. 1♀,	” ” ” ”
1870. 1♀,	” ” ” ”
1863. 1♂, 1♀,	4200 ” ” ” ”
1853. 2♀♀,	3700 ” ” ” ”
1852. 1♀,	4500 ” ” ” ”

Solpuga masienensis, n. sp.

(Text-fig. 4.)

1 ♂, 1 ♀, 6389, Masiene, P.E. Africa.

Colour.—Mandibles infuscated above but not at the sides, headplate broadly infuscated anteriorly, narrowly posteriorly, forming a broad V-shaped patch; abdomen greyish above and below, tarsus and apex of metatarsus of palp slightly infuscate, remainder yellow.

Dentition.—Outer series as in fig. 4, *a*; inner series consisting of a

large distal, moderate middle, and minute proximal tooth, the middle much nearer to the proximal than to the distal tooth.

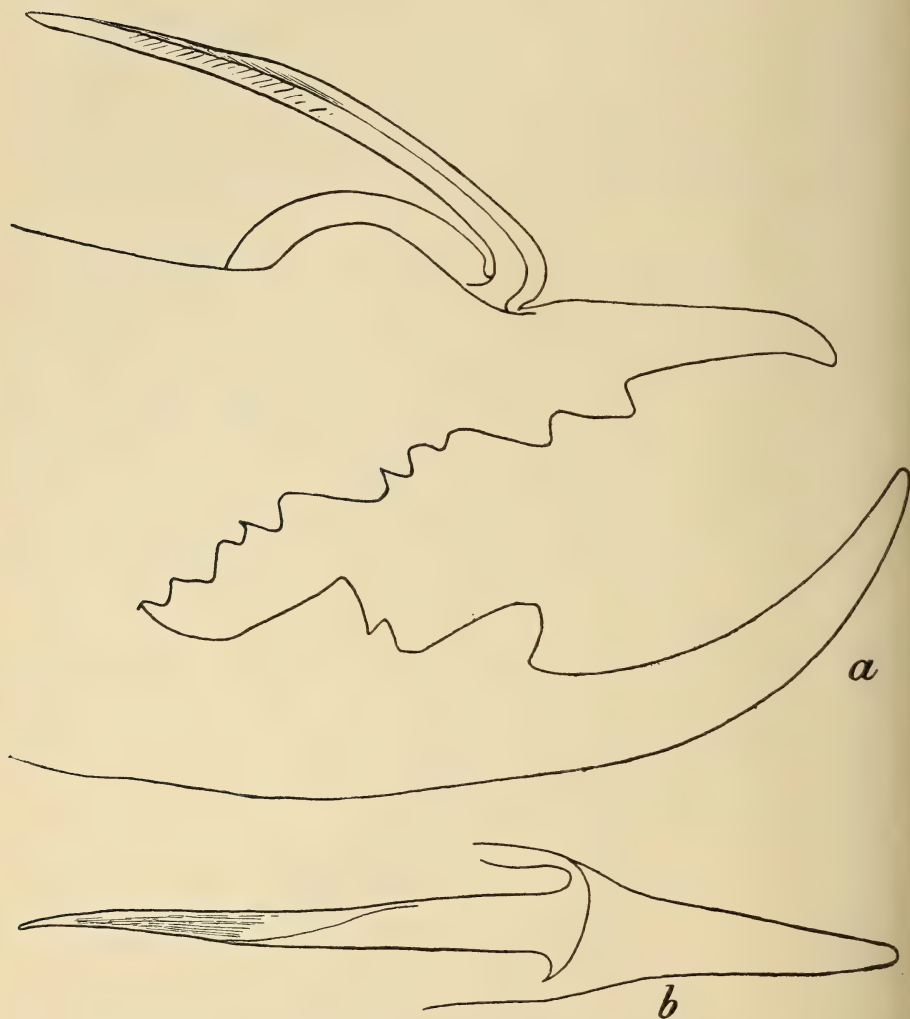


FIG. 4.—*Solpuga masienensis*, n. sp.

Flagellum (fig. 4, *a*) reaching to just half-way between the basal enlargement and anterior margin of the headplate; seen from the outer side it is simple, without serrations, and flattened from above downwards in its anterior half and from side to side in its posterior

half; seen from above (fig. 4, *b*) it is a long, wedge-shaped structure; basal enlargement low and rounded above; fang of jaw just anterior to the bend of the flagellum broad, its upper surface flat to slightly concave (a cross-section taken here would be triangular in shape with the apex of the triangle directed downwards); inner tooth, if present, a minute granule.

Spination.—Mandibles above, with numerous long, strong spines, headplate thickly covered with short spines, three strong spines (similar to those on the mandibles), forming a recurved row on each side of and just behind the ocular tubercle; the latter with two clusters of spines, one anterior, the other posterior to the eyes; headplate fairly densely covered with long, erect setae; metatarsus of palp with a broad scopulate area below, except at base and apex, tibia with a row of 4 long curved setae on its inner side, femur with a row of 4-5 spiniform setae on the inner side.

Measurements.—Width of headplate 7·9, length (including ocular tubercle) 7, tarsus+metatarsus 12·8, tibia 13·3, femur 15·4, total length 31 mm.

♀. Colour as in ♂.

Headplate very much broader than in the ♂, almost twice as broad as long, without strong spines but with a few setae, mandibles with a few strong spines above.

Dentition.—Jaws and teeth much more powerful and larger than in the ♂; upper jaw with two large anterior teeth, the second of which is larger than the first, then two intermediate teeth, the second of which is about twice the size of the first, and is closely followed by a third large main tooth equal in size to the second main tooth, then four teeth, the first and third larger than the second and fourth; inner series consisting of three teeth, the first of which is long and sharp; lower jaw with three teeth fairly close together, the first and third (main teeth) very large.

Measurements.—Width of headplate 10, length 5·6, tarsus+metatarsus 11·3, tibia 10·8, femur 11·7 mm., total length 41 mm.

This species is probably most nearly related to *S. darlingi*, Poc.

Solpuga intermedia, n. sp.

(Text-fig. 5.)

1 ♂, 12264, Montagu Baths.

Colour.—Headplate and appendages yellow, terminal segments of fourth leg a little darker; abdomen dark brown, tergites with two

posteriorly converging blackish stripes at the sides, sternites with a pair of similar but less distinct lateral stripes; malleoli not edged with black.

Dentition very similar to that of *S. erythronotoides*, Hewitt (Ann. Transv. Mus., vol. vii, p. 33, text-fig. 6); the small keel in front of the anterior bend of the flagellum is here bluntly and not conspicuously terminated, but the dentition is otherwise similar to that of *erythronotoides*, loc. cit.

Flagellum reaching to about half-way between apex of the upper



FIG. 5.—*Solpuga intermedia*, n. sp.

jaw and the posterior margin of mandible (fig. 5); it is not so curved as in either *erythronota* or *erythronotoides*, the median portion being almost straight and the distal portion very slightly bent downwards and (seen from above) inwards.

Measurements.—Length of upper mandible 7·5, width of headplate 5·5, length 4·2, tibia 7·1, tarsus + metatarsus 8·1, total length 29 mm.

This may prove to be a variety of either *S. erythronotoides* or *S. erythronota*, though it differs from both in the longer and less curved flagellum, and also in the greater length of the lower jaw as compared with the upper.

Solpuga calycicornis, n. sp.

(Text-fig. 6.)

2 ♂♂, 14582, Burghersdorp.

Colour.—Head and appendages yellow, the latter, especially the fourth leg and palp, with the terminal segments more or less infus-

cated; abdomen above with a broad, median, blackish-brown stripe (deep black in the last four or five segments), bounded laterally by a narrow band of yellow silky hairs.

Dentition as in fig. 6, *a*, closely resembling that of *S. derbiana*, Pocock, as in figure given by Hewitt, Ann. Transvaal Museum, vol. vii, p. 35, text-fig. 7. Seen from the inner side there is in front of and a little below the anterior bend of the flagellum a short, projecting ridge or keel provided with a few granules which terminates about half-way between the fang tip and the first obsolete tooth of the upper jaw without forming a distinct tooth; inner row of double series consisting

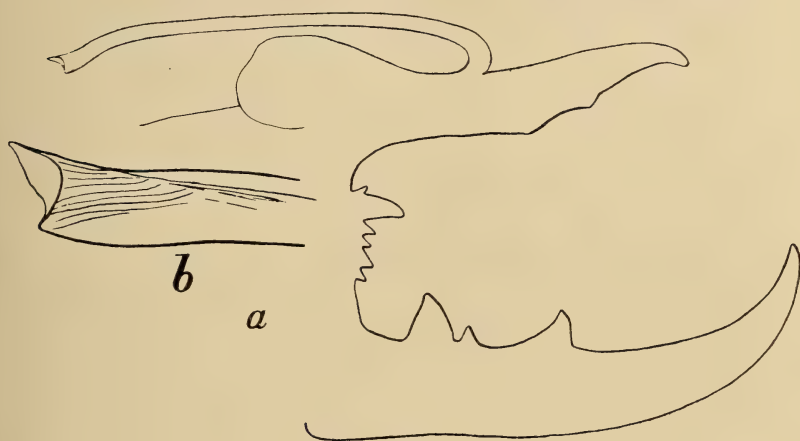


FIG. 6.—*Solpuga calycicornis*, n. sp.

of three teeth increasing progressively in size, the distal one larger and a little farther from the middle one than is the latter from the proximal one. No stridulatory ridges.

Flagellum as in fig. 6, *a*, reaching to about half-way between the basal commencement of flagellum and eye tubercle; seen from above, its long axis is parallel to that of the upper jaw; seen from the side, the flagellum runs practically straight except for the distal portion which is bent a little downwards; seen under higher magnification (fig. 6, *b*), the apex of the flagellum is cup-like with the upper part of its rim drawn out to a point.

Some long, fine hairs on the palpi and some shorter silky ones on the fourth leg, but no mane.

This species closely resembles *S. derbiana*, the main difference being the peculiar structure of the terminal portion of the flagellum; it

also resembles *S. coquinae*, Hewitt, from Cookhouse, but is smaller in size than either *derbiana* or *coquinae*.

Measurements of larger specimen. Width of headplate 4·3, tibia 6, tarsus+metatarsus 5·7, total length 18·5 mm. ; total length of smaller specimen 15·5 mm.

Solpuga phylloceras, n. sp.

(Text-figs. 7, 8, 9.)

1 ♂, 1 ♀, 5215, Pocaltsdorp, near George, C.P.

Resembling *S. vineta* in the flagellum and dentition.

♂. *Colour*.—Headplate, mandibles, and appendages yellow, without



FIG. 7.—*Solpuga phylloceras*.

markings ; abdomen with tergites light brown, bordered at each side by a stripe of deeper brown, sides and sternites dirty yellow. Malleoli without any infuscation.

Dentition as in figs. 7 and 8, *b* ; the toothless anterior portion of the dorsal fang is shorter than in *vineta* ; in the latter species in a number of specimens examined from Signal Hill, Cape Town, the second main

tooth is more or less truncated, fig. 8, *a* representing an extreme case, while that of *phylloceras* is normal; in *vincta* the keel along the dorsal surface of the fang in front of the anterior bend of the flagellum is always provided with more than one small tooth, sometimes as many



FIG. 8.—*a*, *Solpuga vincta*; *b*, *Solpuga phylloceras*.



FIG. 9.—*a*, *Solpuga vincta*; *b*, *Solpuga phylloceras*.

as shown in fig. 8, *a*, though there is usually one prominent and larger than the rest; in *phylloceras* there is one small tooth, the dorsal keel being otherwise smooth (fig. 8, *b*).

Inner series of teeth consisting of two stout, well-separated teeth, the distal larger than the proximal one. Lower jaw resembling that of *vincta* except that the anterior, untoothed portion is shorter.

Flagellum seen from the outer side as in fig. 7. In its brevity and

general formation it resembles that of *vincta*, but is stouter at its base and narrows towards its distal extremity, while the reverse is true of *vincta*. Seen from above (fig. 9, *b*), it differs markedly from the latter in being leaf-like and much broader (at least twice the width), while the apex curves towards the outer side of the mandible (in *vincta* it curves towards the inner side, fig. 9, *a*).

Spination.—Headplate provided with irregularly scattered, brown setae of varying length, cleft at their tips; mandibles with similar but stouter setae; metatarsus of palp with irregular and ill-defined scopula.

♀. *Colour* as in ♂, but the tergites less distinctly pigmented.

Dentition very different to that of the ♂, the teeth large and massive, the upper jaw without a toothless space; upper jaw with two large anterior main teeth, the second a little larger than the first, then an intermediate tooth adjacent to and about half the height of the fourth (main) tooth, which is equal to the second in height, then four moderate teeth; inner series consisting of two large, conical teeth. Lower jaw massive and short, the three teeth large and close together.

Measurements of ♂.—Width of headplate 4·5, length of headplate 3·5, length of mandible 6, tarsus + metatarsus 5·6, tibia 5, total length 23 mm. Total length of ♀ 24 mm. This species belongs to the *maraisi*, *vincta*, *spectralis*, *montana* group, but is much more nearly allied to *vincta* than to any of the other species; it differs from the latter in the much broader leaf-like flagellum and in its light coloration.

Solpuga stiloceras, n. sp.

(Text-figs. 10, 11, 12.)

2 ♂♂, 2 ♀♀. Seven-weeks Poort, Ladismith, Cape Province. At about 6000 feet altitude.

♂. *Colour*.—Headplate and thorax chocolate brown, mandibles dorsally brown, yellow at the sides; pedipalps and legs chocolate brown but with a distinct reddish tinge, the terminal segments blackish; abdomen above, brown to black in the middle, a narrow longitudinal stripe on each side composed of white or dirty-white hairs; the central dark portion with some coarse yellowish hairs; abdominal sternites brown, not as dark as the tergites, clothed with silky yellowish hairs; the genital sclerites and sternites in the one specimen mottled with a number of round black spots near their posterior borders; headplate with some long, brown, scattered, seti-

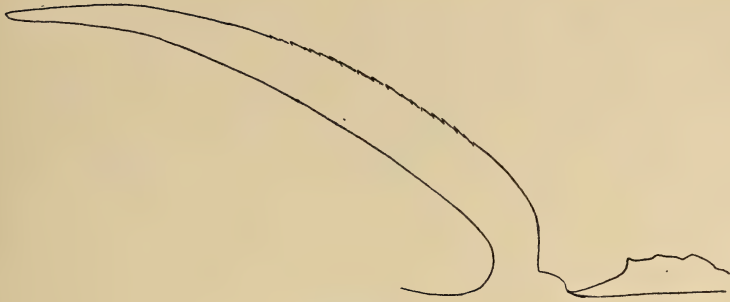


FIG. 10.



FIG. 12.



FIG. 11.

FIGS. 10, 11, 12.—*Solpuga stiloceras*, n. sp.

form hairs and some long yellow ones along the lateral and posterior margins; fourth leg with some long, dirty-white, silky hairs, but no mane; malleoli with infuscated borders.

Flagellum resembling that of *S. phylloceras*, but different when viewed from above. It is shorter, and the anterior bend is situated above the second main tooth and not behind it as in *phylloceras*; the basal enlargement is high; seen from the side (fig. 10), the flagellum appears to be a normal, slightly tapering structure, the serrations being hardly visible; seen from above (fig. 12), it appears as a much flattened, leaf-like structure, its width being much greater than its dorso-ventral thickness; it differs considerably from *phylloceras* in being broad near the base and then tapering rather suddenly, the distal third being very narrow as compared with the remainder; the basal portion and distal two-fifths are free from serrations and spicules.

Dentition as in fig. 11, resembling *S. phylloceras*; the terminal portion of the dorsal fang provided with a keel along the mesial side above; the large toothless interval followed by 2 teeth, the first of which is moderate and not minute as in *phylloceras*; these are followed by the double series of 4 outer and 3 inner teeth, the first of the inner teeth the largest, the third smallest.

Mandibles with fairly stout and numerous brown setae above, stridulatory ridges 8 in number (in both sexes).

Palps. Metatarsus with an oval, scopulated patch below except at apical and basal extremities.

Measurements.—Width of headplate 4·6, length 4, tibia 5·5, tarsus + metatarsus 6·3; total length 23·2 mm.

♀. *Colour*.—Much as in ♂, the abdominal tergites without the well-defined white stripes at the sides, the sides distinctly reddish with silky yellow-white hairs; sternites light brown (the one ♀ with mottling as in the ♂ on the genital region and 5 anterior abdominal sternites), with dark, infuscated, lateral borders; headplate with brown setae not as numerous or as stout as in ♂; malleoli infuscated.

Dentition normal, without a large toothless space as in the ♂; single series consisting of 2 main anterior teeth, then a small tooth, then a third main tooth; double series consisting of 4 outer and 3 inner teeth, the third inner tooth minute.

Measurements.—Width of headplate 4·5, length 3·5; total length 20 mm.

This species belongs to the sub-group formed by *S. vineta* and *S.*

phylloceras; it is evidently more closely allied to *phylloceras* than to *vineta*, but differs from the former in the shortness of the flagellum, the shape of the flagellum seen from above, and the fact that its distal two-fifths is free of serrations. In colour it resembles the typical diurnal coloration of *vineta*, and in the dentition it perhaps resembles this species slightly more than *phylloceras*.

Genus ZERIASSA, Poc.

Zeriassa furcicornis, n. sp.

(Text-fig. 13.)

1 ♂, 1896, Kaapmuiden, E. Transvaal.

Colour.—Headplate infuscated pale violet, darker at the sides, bisected in the middle by a pale, narrow line; mandibles infuscated pale violet, a darker patch at the sides anteriorly, which gives off three longitudinal lines, one inner, one in the middle, and one outer lateral; palps, except at base of femur; legs, except tarsal segments, infuscated violet, a little lighter below; tergites of abdomen violet, sides and sternites yellow.

Dentition as in fig. 13, *a*, seen from the outer side; inner series consisting of 3 teeth diminishing in size posteriorly, the second a little nearer to the third than to the first.

Flagellum.—Seen from above, the flagellum at its anterior bend is equal in width to the width of the jaw, narrowing gradually to its point of bifurcation and describing a regular curve inwards; seen from the outer side (fig. 13, *a*), the flagellum is flattened from above downwards and is slightly twisted so that its horizontal plane becomes a more or less vertical one in its distal portion; the tip of the flagellum (fig. 13, *b*) is bifurcate, the lower prong being simple, the upper one serrated; the space between the two prongs is filled up with transparent substance which is slightly frayed at its distal edge; a narrow curved band rises from the lower prong and apparently connects it with the upper one.

Spination.—Coxae of third pair of legs with a group of 7–9 stout cylindrical bristles with slightly enlarged and darkened tips; metatarsus scopulate below in its proximal two-fifths, the unscopulate portion with an irregular double row of 6–7 spines, tarsus with 3–4 spines below.

Measurements.—Length of mandible 4·4, mandible+headplate 7, width of headplate 4, total length 17 mm.

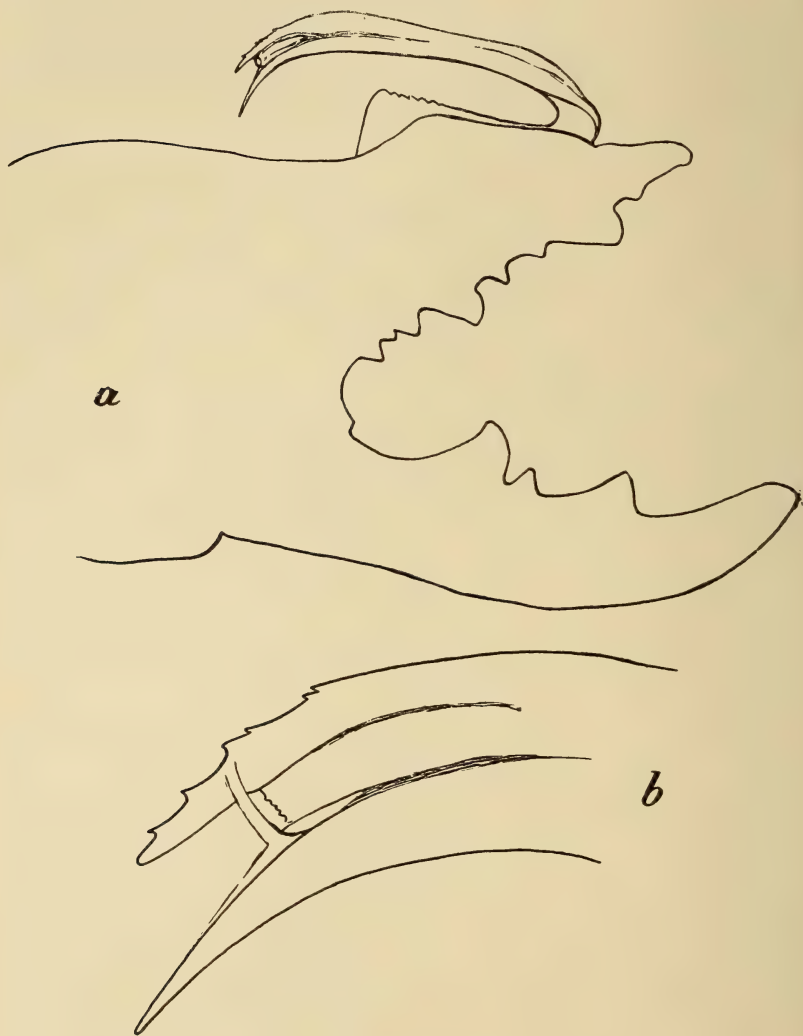


FIG. 13.—*Zeriassa furcicornis*, n. sp.

This species differs from *Z. cuneicornis*, Purcell, in at least the bifurcation of the distal apex of flagellum, while differing from *Z. purcelli*, Hewitt, in the same respect, as well as in the greater length of the whole flagellum, and in the dentition.

Genus BLOSSIA, E. Simon.

Blossia alticursor, n. sp.

(Text-fig. 14.)

1 ♂, 1837. Great Winterhoek Mountains, 5000 feet.

Closely related to *B. litoralis*, Purcell, Ann. S.A.M., vol. iii, p. 4.

Colour as in *B. litoralis*, loc. cit.

Mandibles.—Upper jaw stout, its apex less curved than in *B. litoralis* without a differentiated bristle, dentition as in fig. 14; lower jaw

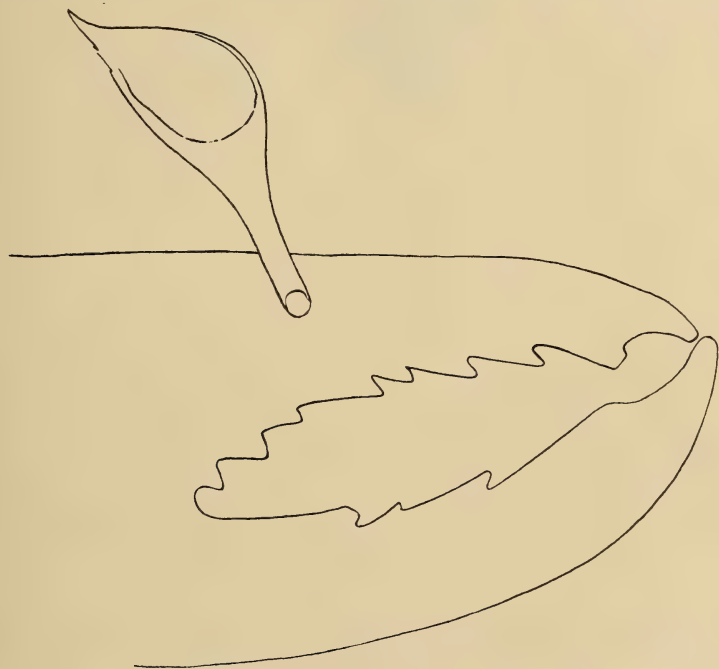


FIG. 14.—*Blossia alticursor*, n. sp.

stouter and on an average deeper than the upper jaw (the opposite is the case in *B. litoralis*); the dentition of both jaws in general resembles that of *B. litoralis*, except that the first tooth of the upper jaw is unaccompanied by a “smaller, more conical, outer tooth” next to it; the first tooth of the lower jaw is here replaced by a low, rounded, talus-like prominence behind which the outline of the jaw runs straight as far as the second tooth, thus giving greater depth to the jaw than is the case in *B. litoralis*.

Flagellum, seen from the outer side through the transparent jaw (fig. 14), is more drawn out distally than in *B. litoralis*, and resembles that of *B. crepidulifera*, Purcell; the distal edges are not or very slightly frayed and certainly not so distinctly as in *B. crepidulifera* or *B. litoralis*; when rotated forwards the flagellum surpasses by a little the fang tip of the dorsal jaw.

Spinination.—Headplate thickly covered with short spines, some moderately long ones at each side of the headplate and along its posterior border; ocular tubercle in front of and below the eyes with two fairly stout, short, slightly incurved spines.

Tibia of palp with an outer row of 3 spines and an apical seta, inner side without spines; there seem to be no true spines on the metatarsus. Abdomen with the three filiform hair-like structures on the under-surface of second segment as described in *B. crepidulifera*.

Measurements.—Width of headplate 2·8, length 2·3, tibia 3·9, metatarsus+tarsus 3·5, headplate to tip of jaw 2·7, total length about 12·6 mm.

Blossia grandicornis, n. sp.

(Text-fig. 15.)

1 ♂, 6829. Fraserburg, C.P.

Colour.—Mandibles yellow, headplate except a narrow median pale stripe, legs except tarsi, and palpi infuscated reddish brown, tergites infuscated light reddish brown, ventral surface of abdomen ashy grey.

Dentition.—Outer series seen from the outer side as in fig. 15. Inner series consisting of 3 teeth, the first 2 subequal and moderate, the third minute, the second much nearer to the third than to the first.

Flagellum as in fig. 15, seen from the outer side; its distal two-thirds covered with spicules, the edges more or less frayed into minute points, the median rib is stout and very conspicuous, especially distally, where it narrows uniformly; rotated forwards the apex of the flagellum reaches a point which is a little farther from the fang tip than this is from the point of origin of the first tooth.

Spinination.—Tibia of palp with 5 spines on the inner side, the two basal ones setiform; proximally at the sides with a number of short cylinder bristles; femora with one or two setae on inner apex; head densely covered with short, sharp prickles, one or two larger spines on the lateral borders of the headplate; a short, stout, inwardly directed spine behind each eye, another on each side between this

and the antero-lateral angle of the headplate ; a pair of strong spines in front of the ocular tubercle, a pair of smaller spines (about half the length of the first pair) behind these and between the eyes.

Second abdominal sternite with a pair of salmon-pink, thickened



FIG. 15.—*Blossia grandicornis*, n. sp.

hair structures on each side of the median line directed inwards and crossing.

Measurements.—Length of mandible 2·5, width of headplate 2·1, length 2·1. Total length 11·5 mm.

This species is related to *B. laminicornis*, Hewitt, from de Aar.

Blossia hessei, n. sp.

(Text-fig. 16.)

1 ♂, 7237. Fraserburg, C.P.

Colour.—Mandibles lightly infuscated with slight indications of

two stripes above, headplate fairly deeply infuscated, anterior margin blackish, a lighter diamond-shaped patch in the centre, legs and palpi except last segment infuscated reddish brown, except the under surfaces, which are yellow and sharply marked off from the infuscated portion; tergites infuscate, more so in posterior than in anterior half, ventral surface of abdomen light ashy grey.

Dentition as in fig. 16, *a* seen from the outer side, fig. 16, *b* from inner side; at the apex of the fang of the upper jaw there is on the outer side a lamina ending in a blunt tooth above the first tooth; inner series consisting of two fairly large subequal teeth, the second of which is

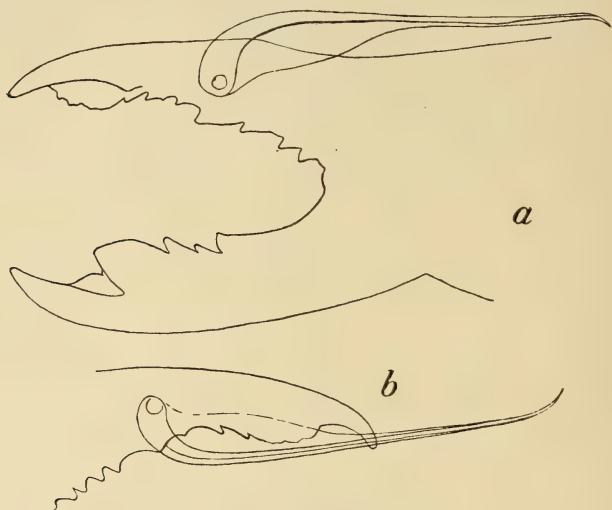


FIG. 16.—*Blossia hessei*, n. sp.

closely followed by a small tooth; the ventral surface of the upper jaw is fringed on the outer side by a row of strong bristles, the most anterior of which, situated in front of and below the rotatory centre, is very stout and short; lower jaw deeper and more massive than the upper jaw.

Flagellum as in fig. 16, *a* and *b*, very long; when rotated forwards (fig. 16, *b*) it exceeds the fang tip by not much less than half its own length; the tip curved downwards narrows to a sharp point.

Spination.—Headplate with short spines not nearly as dense as in *B. grandicornis*; mandibles and headplate with a few long setae cleft at their tips; tibia of palp with three stout setiform spines occupying the inner side of its middle part. Second ventral segment with three

modified hair structures on each side of the middle line directed inwardly and curved.

Measurements.—Mandible 2.1, length of headplate 1.7, width 1.8, total length 9.5 mm.

Blossia falcifera var. *transvaalica*, n. var.

(Text-fig. 17.)

2 ♂♂, 14599. Johannesburg.

Colour as in *B. falcifera*.

Dentition as in fig. 17; the fang tip of the dorsal jaw is longer than in *falcifera*, and is provided just in front of the first tooth with a minute



FIG. 17.—*Blossia falcifera* var. *transvaalica*, n. var.

granule; dentition of lower jaw as in *falcifera*, the first tooth in both these specimens being bifid.

Flagellum (fig. 17) stouter distally than in the type but of the same general form, provided at its apex with a minute hooked process; seen from the side, two bristles arise from the dorsal surface behind the rotatory centre, the one nearest the flagellum passes on the outer side of it, the farthest from the flagellum passes it on the inner side; both project downwards and bear minute prickles, which are, however, not shown in the figure; these two bristles are distinct from the

other normal bristles on account of their outstanding thickness and the fact of their bearing prickles.

Spination.—Headplate and mandibles with a fairly large number of cleft setae; second abdominal sternite with three modified hair structures on each side crossing at their tips.

Total length about 9 mm.

Gen. MELANOBLOSSIA, Purcell.

Melanoblossia ? *hewitti*, n. sp.

(Text-fig. 18.)

1 ♂. Henkries, near the Orange River, Little Namaqualand.

Colour.—Headplate and appendages yellow, tergites of abdomen brown, sides and sternites ashy grey.

Dentition as in fig. 18, *b* seen from the outer side; the upper jaw is almost edentate with a few tooth-like granules. Lower jaw with 5 small but distinct teeth increasing progressively in size distally, pointed and sloping slightly forwards; lower jaw a little longer than the upper.

Flagellum not apparent.

Spination.—Seen from the inner side (fig. 18, *a*), the upper jaw is well provided with feather bristles, the largest and most striking group being composed of 5–6 long, stout plumes; these and 3–4 shorter ones above them seem to be placed on the posterior rim of an elliptical depression which is situated posteriorly and ventrally to the upper jaw; below the main group is a smaller group, their bases forming a rough curve, their tips strongly bent and pointing downwards.

The lower jaw is provided with a number of stout setae of varying lengths which occupy that part of it posterior to the last and smallest tooth; they are most numerous towards the dorsal surface of the jaw, the anterior ones being longest and stoutest; the outer side of the lower jaw is not provided with bristles or setae except for one or two setae at its extreme base near the articulation with the upper jaw. Upper jaw dorsally with one or two forwardly directed setae. Six stridulatory ridges.

Appendages.—Pedipalps with some long, slender, and shorter setae but no spines below; first leg not provided with small or minute claws; all tarsi consisting of one segment; the fourth tarsus resembles that of *Melanoblossia braunsi* in its slenderness, but I am unable to see any sign of an articulation; its length is about ten times its width.

Headplate with short bristles and some longer brown setae.

Abdomen above with a few, sides with fairly numerous cleft setae; second abdominal sternite with a group of five long, fleshy hairs on each side of the median line.

Measurements.—Total length about 10 mm.

In the length and slenderness of the jaws, and especially in the

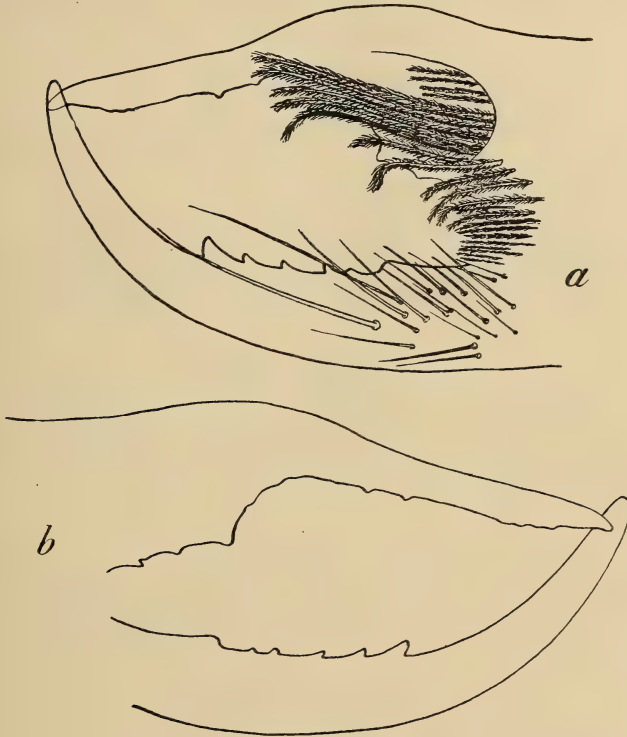


FIG. 18.—*Melanoblossia hewitti*, n. sp.

arrangement of the feather bristles, it resembles *Lipophaga* (*Pseudoblossia*) *schultzei*, Kraepelin, but again differs from this species in having no claws on the first tarsus, in being provided with fleshy hairs on the second abdominal sternite, and in its smaller size. It appears to represent an intermediate stage between *Melanoblossia* and *Lipophaga*.

Although differing from *Melanoblossia* in the important respect of the fourth tarsus, I have placed this species provisionally under this genus until more material can be accumulated. It is named in honour

of our foremost South African arachnologist, Mr. Hewitt, Director of the Albany Museum, Grahamstown, whose widespread knowledge and co-operation have been of invaluable assistance to me in studies of South African arachnids.

OTHER RECORDS.

Gen. *SOLPUGA*, Licht.

Solpuga vincta, Koch.

1 ♂. 4000 feet, Lemoenshoek, Heidelberg Mountains. Coll. K. H. Barnard.

1 ♂. 2000 feet, Hermanus. Coll. E. L. Gill.

1 ♂. Barrydale, Swellendam District. Coll. A. J. Hesse.

1 ♂. Zuurbraak Peak, Swellendam. Coll. R. F. Lawrence.

1 ♂. Giftberg, Van Rhynsdorp. Coll. R. M. Lightfoot.

Solpuga maraisi, Hewitt.

1 ♂. Tradouw Pass, Swellendam. Coll. R. F. Lawrence.

1 ♂. 6000-7000 feet, Matroosberg Mountains, Ceres. Coll. R. W. Tucker.

1 ♂. Touws River. Coll. Paynter.

Solpuga celeripes, Hirst.

6 ♂♂. Kaapmuiden, Eastern Transvaal. Coll. R. W. Tucker.

1 ♂. Acornhoek, Eastern Transvaal. Coll. R. W. Tucker.

Solpuga serraticornis, Purcell.

1 ♂. Kaapmuiden, Eastern Transvaal. Coll. R. W. Tucker.

1 ♂. Messina, North Transvaal. Coll. R. W. Tucker.

Solpuga schonlandi, Pocock.

5 ♂♂. Smithfield, Orange Free State. Coll. Kannemeyer.

1 ♂. Grootfontein, South West Africa. Coll. R. M. Lightfoot.

Solpuga monteiroi, Pocock.

2 ♂♂. Junction of the Crocodile and Marico rivers, Transvaal. Coll. R. W. Tucker.

Solpuga sericea, Pocock.

- 1 ♂. Grootfontein, South West Africa. Coll. J. Drury.

Solpuga fusca, Koch.

Specimens from Caledon, Kalk Bay, Constantia, Stellenbosch, Cape Province.

Gen. *DAESIA*, Karsch.

Daesia lineata, Pocock.

- 1 ♂. Fraserburg, C.P. Coll. A. J. Hesse.

Daesia rhodesiana, Hewitt.

- 2 ♂♂. Messina, North Transvaal. Coll. R. W. Tucker.
1 ♂. Potgietersrust, Transvaal. Coll. Dr. Melle.

Daesia bernhardi, Pocock.

- 1 ♂. Montagu. Coll. R. W. Tucker.
1 ♀. Montagu. Coll. K. H. Barnard.
1 ♂, 1 ♀. Matroosberg Mountains, Ceres. Coll. R. M. Lightfoot.

Daesia namaqua, Kraepelin.

- 1 ♂. Henkries, near the Orange River, Little Namaqualand.
Coll. R. M. Lightfoot.

Gen. *BLOSSIA*, Simon.

Blossia echinata, Purcell.

- 1 ♀, 1 ♂. Beaufort West. Coll. W. F. Purcell.

Gen. *CHELYPUS*, Purcell.

Chelypus barberi, Purcell.

- 2 ♂♂. Kalahari Desert, 600 miles north-east of Upington. Coll. Jackson.

Chelypus lennoxae, Hewitt.

- 1 ♂. Upington. Coll. Father Sollier.



5. *Contributions to the Crustacean Fauna of South Africa.*—By K. H. BARNARD, M.A., D.Sc., F.L.S., Assistant Director.

NO. 10. A REVISION OF THE SOUTH AFRICAN BRANCHIOPODA
(PHYLLOPODA).

(With 33 Text-figures.)

INTRODUCTION.

LATREILLE'S division of the Crustacea into the *Malacostraca* and the *Entomostraca* persists even at the present day, though it is recognised that the latter "constitute a very heterogeneous group, defined only by negative characters and having no claim to retention in a natural system of classification" (Calman, 1909).

The term Entomostraca, however, is frequently employed, in a general and colloquial manner, to denote the more lowly Crustacea, such as the Water-fleas (*Cladocera*), Cyclops (*Copepoda*), the Ostracods, the Barnacles (*Cirripedia*), and the group here dealt with—the Branchiopods or Phyllopods.

Using the term in this sense, but excluding the Barnacles, it may be said that the Entomostraca are an important constituent of the fresh-water fauna of South Africa. They are found in streams, lakes, vleis, dams, wells, either permanent or temporary. These Crustacea lay "resting-eggs," which are able to withstand desiccation for considerable periods; when the vleis and dams dry up, these eggs, either in mud adhering to the feet of various aquatic birds, or in the dust blown about by the wind, can be carried far and wide over the country. When the rains fall, the eggs hatch.

It is possible, therefore, to collect these animals not only in the adult stage direct from ponds and dams, etc., but in the egg stage during the dry season. Samples of mud from the bottom and margins of dried-up pools are taken and placed in small glass jars with water, and when the Crustacea hatch they may be preserved and examined in all stages of development.

This is an extremely valuable method of collecting, and no oppor-

for the most part, however, dealing only with the fauna of the Cape Province. As a basis for identifying and studying the fauna of the rest of South Africa these papers are very valuable.

The following account of the fourth group—the Branchiopoda or Phyllopoda—is based on what appears to be a considerable amount of material from many localities. But when the localities are plotted on a map (fig. 1) it is seen how scattered they are, and how very inadequate our collections are at present for the purpose of giving anything approaching a thorough survey of the Branchiopodan fauna of South Africa. Many additional species will certainly be added to the fauna-list in the future, and the distribution of those already recorded remains to be worked out. Paradoxical as it seems, Ovamboland may be said to have been more intensively explored than any other single region, thanks to the Administration of South West Africa in aiding the South African Museum expeditions to that territory.

The fossil representatives found in this country have been included, because they lead (at least in the case of *Lepidurus*) to interesting inquiries as to changes of climate during past geological epochs.

Acknowledgments are due to the Directors and Curators of the other Museums in the Union and Rhodesia, who have placed all their material at my disposal; and also to Dr. Haughton of the Geological Survey; Mr. J. H. Power of Kimberley; Dr. Calman of the British Museum; and to Mr. R. Gurney, whose work on the Entomostraca is well known.

As regards a portion of the material collected by myself and my colleagues, I have to acknowledge herewith: (1) a grant from the Research Grant Board in 1920, which enabled me to visit Ovamboland early in 1921; (2) the financial and other assistance rendered by the Administration of South West Africa and its officials, particularly Dr. Fourie, Major Manning, and Lieut. Hahn, in carrying out the Zoological Survey of South West Africa (chiefly Northern Damaraland, Ovamboland, and the Kaokoveld) in the years 1920, 1923, 1925, 1926.

The localities quoted are those from which the South African Museum has material, except where otherwise stated. The Institutions where type material is preserved are quoted in most cases. A set, including cotypes of the author's species, is in the British Museum.

DISTRIBUTION.

For reasons already stated no attempt is here made to draw conclusions from the recorded distributions of the (living) species, but

attention may be directed to one or two outstanding features of the distribution and composition of the Phyllopod fauna.

Following Daday, 11 families are recognised: 5 in the *Anostraca*, 1 in the *Notostraca*, and 5 in the *Conchostraca*. All these families are represented in our region with the exception of the Anostracan family

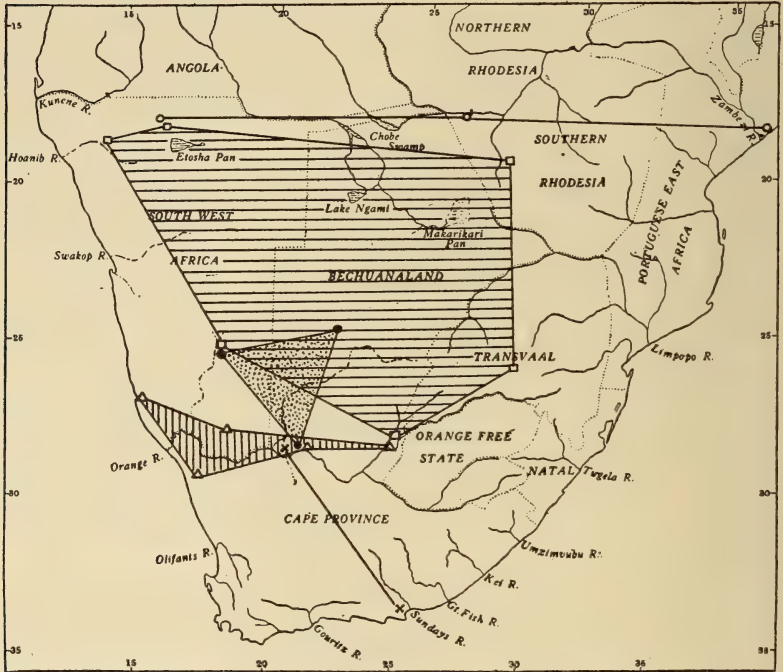


FIG. 2.—Distribution of: ○ *Cyclestheria*, □ *Eulimnadia africana*, △ *Apus namaquensis*, ● *Leptestheriella*, × *Artemia salina*. The recorded localities are merely linked up, without any implication that the species occurs everywhere within, and nowhere outside, the polygonal areas so formed.

Polyartemiidae, which hitherto has only been found in the Palaearctic region (with extensions to Alaska and the Pribiloff Islands). The other families are nearly world-wide in distribution, the apparent poverty of South America being probably due to lack of collecting.

As regards genera, 37 genera are known up to the present: * 22 Anostracan, 2 Notostracan, and 13 Conchostracan. Only 12 of these are represented in South Africa—5, 1, and 7 respectively. The

* Excluding *Bouvieria* Daday (see Intern. Catal., xiii, Crust., p. 40, 1914) and *Proterothriops* Ghigi.

Conchostracan element is therefore of a more cosmopolitan character than the Anostracan.

One genus (*Branchipodopsis*) is noteworthy in being almost exclusively South African (fig. 4). Eleven species are recorded, one of which has been reported also from British East Africa; the twelfth species comes from Mongolia, thus constituting a rather remarkable case of discontinuous distribution.

Within the confines of the South African region scarcely any conclusions can be drawn as to distribution which might not be vitiated any day by the field collector, especially if he goes out with the special purpose of collecting these animals.

The genus *Leptestheriella* occurs in Southern Asia, Tropical Africa, and Madagascar, localities where apparently there is an abundant rainfall. Yet up to the present it has only been found in South Africa at three localities where the rainfall is distinctly low (fig. 2).

In the matter of species, 46 are recorded in the present paper.* Of these 26 are represented in the Cape Province, 18 in Ovamboland, 15 in Great Namaqualand, 14 in Transvaal, and 12 in Bechuanaland. Then follow in order—Kaokoveld (8), Damaraland (7), Orange Free State (6), Southern Rhodesia (4), Basutoland (3), Natal and Little Namaqualand (2 each), and Portuguese East Africa (1). The high (relative) abundance of species in Ovamboland and in the inaccessible and very little visited Kaokoveld is certainly due in part to the intensive collecting by the present writer and his colleagues. The same applies to Great Namaqualand and Bechuanaland, where members of the Museum staff and correspondents have been specially requested to collect these animals. Mr. J. H. Power of Kimberley has been especially assiduous in this matter; also Mr. G. E. Hutchinson, formerly of the Witwatersrand University, Johannesburg.

The comparative poverty of the Orange Free State and Natal is striking, and, in view of the greater accessibility of these areas, raises a doubt as to whether this poverty is really due to lack of collecting, or whether it may not be due partly to a real poverty of species, caused by unfavourable or less favourable conditions of existence. It may be mentioned that the number of species recorded from the Transvaal has been raised from 5 to 14 by collecting in very few localities only.

On the map (fig. 1) are plotted the actual numbers of species recorded from the different localities in the present paper.

* Excluding the doubtful *Lynceus wahlbergi*.

RESEARCH.

Now that there are, in addition to the museums, several universities and university colleges teaching zoology in South Africa, it may be useful to indicate one or two lines on which research might be conducted.

In the first place, intensive collecting over the whole of South Africa is badly needed; and if one area needs it more than another, then a glance at the locality-map (fig. 1) will show that Natal, Transvaal, Rhodesia, and Northern Bechuanaland are more likely to yield results than the other areas.

The sporadic appearance, both in time and space, of many Phyllo-pods is well known. A species may be found in one year in a certain locality and not in subsequent years. But it may make its appearance in a neighbouring locality where it was not previously known. Collecting, even in one locality, requires therefore to be carried on over a number of years if possible.

The environmental factors governing the appearance and distribution of these animals require to be studied. Daday (1910, Ann. Sci. Nat., ser. 9, vol. xi, p. 462) believed that there was an intimate relation between the habitats and the temperature, and gave a table of the Anostracan genera occurring within different isothermal lines. Temperature no doubt is a factor to be considered, but probably the distribution does not follow the isothermal lines quite so simply as Daday thought. The temperature at certain particular seasons of the year is probably a far more decisive factor than the mean yearly temperature.

Similarly, the isohyetal lines will not explain the distribution, for these ignore the seasonal character of the rainfall and the permanent or temporary character of the vleis and ponds.

Differences, if any, in the composition of the fauna of permanent and temporary ponds, etc., also require to be worked out, together with the salinity and chemical composition of the water.

The peculiar distribution of *Apus namaquensis* (fig. 2) requires an explanation. In South Africa it has been found in a few localities, from Angra Pequena (Lüderitzbucht) and Bushmanland eastwards to Kimberley, where it occurs along with *A. numidicus*; it has been reported from one locality in British East Africa.

The distribution of *Branchipodopsis* (fig. 4) invites comparison with that of *Streptocephalus* (fig. 8) and *Apus* (fig. 24). Clearly none of these distributions can be explained in terms of simple isotherms and

isohyets. Local meteorological conditions should receive close attention. It should be noted that in these maps the recorded localities are merely linked up, without any implication that the species occurs everywhere within, and nowhere outside, the polygonal areas so formed.

On the question of the hatching of the resting eggs, confirmation of Brauer's results (see *infra*, p. 227) is much desired. Experiments to determine to what extent desiccation of the ova is necessary to ensure their development could be easily instituted, and should be undertaken not only for *Apus* but for as many as possible of the South African Phyllopods.

The one exception to the production of resting eggs, namely, the viviparous *Cyclestheria*, seems to be confined to permanent water-holes and pools, as one would expect to be the case. Two of the localities in Ovamboland where the present writer found this form were water-holes belonging to populous native villages, which probably would not dry up during the dry season. Two other localities, however, appeared to be only temporary vleis. It would be interesting to determine, therefore, whether *Cyclestheria* is able to retain vitality while buried in the mud during the dry season, and to breed when released at the next wet season, in a similar manner to *Cryptocyclops inopinatus* (see Sars, Ann. S. Afr. Mus., xxv, p. 136, 1927).

BRANCHIOPODA.

Calman (1909, Lankester's Treat. Zool., vii, 3, Crust., pp. 52, 53) makes the *Branchiopoda* a subclass of the *Crustacea*, with four orders : *Anostraca*, *Notostraca*, *Conchostraca*, and *Cladocera*. Gurney, Brady, Methuen, and especially G. O. Sars, have dealt with the South African *Cladocera*. The other three orders are dealt with here.

Body usually elongate, uniformly segmented ; without a carapace, or with a carapace which may form a dorsal shield or a bivalve shell ; usually ending in a caudal furca. Compound eyes present, usually close together ; the single nauplius eye or ocellus usually persisting in adult. Antennules generally reduced and unsegmented. Trunk-limbs varying greatly in number, usually foliaceous, rarely pediform.

Development usually by metamorphosis, the young passing through a free-swimming nauplius or metanauplius stage.

With the exception of a very few marine *Cladocera*, the whole subclass is non-marine, living in fresh water, though some are found in brackish water and saline marshes.

ORDER 1. ANOSTRACA.

1867. *Anostraca*. Sars, Crust. d'eau douce Norv., pp. 5, 6.
 1902. *Gymnophylla*. Stebbing, Encycl. Brit., ed. 10, vol. xxviii
 (Suppl., vol. iv), p. 269.
 1910. *Anostraca*. Daday, Ann. Sci. Nat., ser. 9, vol. xi,
 p. 91 (monograph), and *ibid.*, xii, p. 241
 (appendix).
 1913. „ *Id.*, *ibid.*, ser. 9, vol. xvii, p. 207 (appendix).

Body elongate, without carapace, ending posteriorly in a caudal furca. Posterior segments without legs (apodous). Paired compound eyes pedunculate; a small median sessile ocellus in front. First antennae short, slender. Second antennae large and prehensile in ♂, reduced in ♀. Trunk-limbs (legs), 11–19 pairs; none postgenital. Rami of the caudal furca unsegmented. Genital ducts opening on the first two apodous segments, which are more or less fused. Paired eversible penes in ♂. Ova retained in an ovisac formed of the united oviducts. Young hatched in the Metanauplius stage.

Distribution world-wide. Some species living in salt lakes and saline marshes.

Throughout this order *specific* differences in the females are very slight, and the classification is based mainly on the male characters. Consequently isolated female specimens can usually be placed only in their respective families. The elongate abdomen without (usually, or with reduced) caudal furca will at once distinguish *Artemia*; a short, more or less globular ovisac will indicate a Branchipodid or a Chirocephalid, and an elongate ovisac a Streptocephalid. The second antenna is lanceolate in the Chirocephalids, oblong with an apical point in the Branchipodids. Identification of the various species within the families will be next to impossible, though in a few cases there are distinctive features.

In Stebbing's General Catalogue of South African Crustacea, 1910, only 6 species of this order are listed. The present work records a total of 27 species.

Key to the South African families.

1. Second antennae in ♂ biarticulate.
 - a. Head without frontal process.
 - i. Bases of 2nd antennae ♂ not, or but slightly, connate, without processes *Artemiidae*.

- ii. Bases of 2nd antennae ♂ connate, forming a clypeus, with two processes of various shape *Branchipodidae*.
b. Head with frontal process. Bases of 2nd antennae ♂ separate *Chirocephalidae*.
2. Second antennae in ♂ triarticulate, cheliform *Streptocephalidae*.

FAM. ARTEMIIDAE.

1896. *Artemiidae*. Grochowski, Verh. zool. bot. Ges. Wien., xlv,
p. 99.

1910. *Branchinectidae*. Daday, Ann. Sci. Nat., xi, p. 111.

Eleven pedigerous segments. Eight or nine abdominal (apodous) segments. Head in ♂ without frontal process. Second antenna ♂ biarticulate, not, or only slightly, fused at base, without processes. Legs with a single branchial lamina. Rami of caudal furca variable, fused with last abdominal segment or freely movable. Ovisac subglobular or cylindrical.

Europe, Asia, North and South America, Australia, North and South Africa. In stagnant water, fresh or saline.

The family should take its name from the oldest genus; Daday was incorrect in forming a new family name.

Only one genus in South Africa.

Gen. ARTEMIA Leach.

1819. *Artemia*. Leach, Dict. Sci. Nat., xiv, p. 543.

1910. „ Dadav, Ann. Sci. Nat., xi, p. 114.

Body slender, abdomen often exceeding the trunk in length. Eight abdominal segments, the last one often much longer than any of the others. Bases of 2nd antennae in ♂ slightly fused; inner margin with a wart-like knob; 2nd joint flattened, laminate, apically acute. Ovisac subglobular. Rami of caudal furca movable, or fused with last abdominal segment, or absent.

Two species are recognised : *salina*, with the last abdominal segment longer than the others, with a wide distribution ; and *jelskii*, with the last abdominal segment not longer than the others, placed in the subgenus *Callaonella*, from South America. *A. salina* is an extraordinarily variable species, and the variations appear to depend, partly at least, on the degree of salinity of the water in which the animals live. They can live in both fresh water and saline water,

even of a high concentration, being found in the evaporation pans used in the manufacture of salt.

The old statement that *Artemia* when bred through successive generations in water of diminishing salinity developed the characters of an allied genus "Branchipus," and that the latter developed into *Artemia* if the salinity were increased, was due to a confusion of taxonomic characters. The old "Branchipus," *sensu lato*, contained several diverse species. The true *Branchipus*, as nowadays defined, belongs to the family *Branchipodidae*. Thus in the experiments which gave rise to the above statement there was no change from one genus to another, but merely a variation of characters which are now regarded as not even specific.

Artemia salina (Linn.).

(Text-fig. 3.)

1758. *Cancer salinus*. Linne, Syst. Nat., 10th ed., i, p. 634.

1910. *Artemia salina* and vars. Daday, Ann. Sci. Nat., xi, p. 117, figs. 4-7 (references and synonymy).

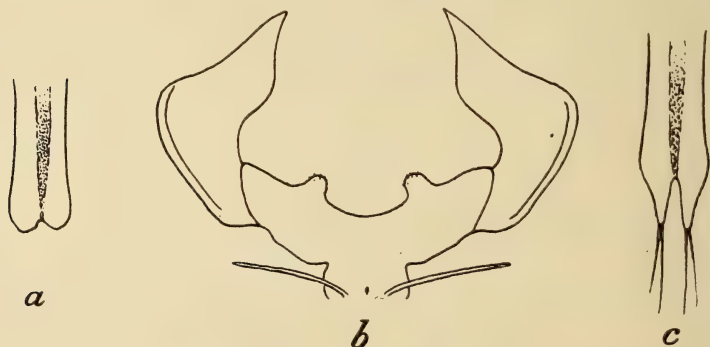


FIG. 3.—a, b, *Artemia salina* var. *köppeniana*, apex of abdomen and 2nd antennae of ♂. c, var. *milhausenii*, apex of abdomen.

var. *köppeniana* Fischer.

1851. *Artemia köppeniana*. Fischer in Middendorff, Reise Nord. u. Ost. Sibériens, ii, p. 157, pl. vii, figs. 29, 30, 36, 37.

1910. *Artemia salina* var. *köppeniana*. Daday, *loc. cit.*, p. 123, fig. 5a.

Last abdominal segment subtruncate or slightly bilobed. Caudal furca entirely absent.

Length.—Up to 8–9 mm.*

Colour.—Reddish, eyes dark.

Locality.—Cape Province: salt pans at Port Elizabeth and Zwartkops; pans at Narugas and Kourop (Gordonia District).

Distribution.—(var. *köppeniana*) Southern Russia (Daday).

var. *milhausenii* (Fischer).

1834. *Branchipus milhausenii*. Fischer, Bull. Soc. Sci. Nat. Moscow, vii, p. 459, pl. xvi.

1910. *Artemia salina* var. *milhausenii*. Daday, loc. cit., p. 126, figs. 4e, 5b–l.

Last abdominal segment produced in two more or less divergent digitiform processes, representing the caudal furca, each tipped with 1–3 setae.

Length.—8–10 mm.

Colour.—(As preserved) whitish, eyes dark.

Locality.—Cape Province: Port Elizabeth (N.E. Prince Alfred Lake) (Albany Museum).

Distribution.—(var. *milhausenii*) Crimea, Transcaspia, Kirgiz, Persia (Daday).

Up to the present this species has been found in only two localities in South Africa. Daday (1910, p. 121) remarked on the apparent absence in South Africa of this nearly cosmopolitan species.

Only a few specimens are in the South African Museum: the first lot were collected in December 1909 and January 1910 by J. L. Drege, who was instrumental in bringing to light several other forms of Entomostraca in the neighbourhood of Port Elizabeth. Specimens were sent by the late Dr. Purcell in 1910 to the late G. O. Sars, but it seems that the latter never had occasion to publish the record.

The second lot were collected by myself in the Gordonia District. They were not collected alive, but picked out of dried mud, and consequently are in a poor and fragmentary condition. They can be identified as *A. salina*, and may belong to var. *milhausenii*, though one specimen seems to indicate that they may be var. *principalis* Simon, with well-developed movable caudal furca. Attempts to breed specimens from the dried mud have hitherto proved unsuccessful.

The specimens in the Albany Museum, assigned to var. *milhausenii*, were also collected by J. L. Drege.

* Throughout the Anostraca the length given does not include the caudal furca, except where specially stated.

FAM. BRANCHIPODIDAE.

1910. *Branchipodidae*. Daday, Ann. Sci. Nat., xi, p. 287.

Eleven pedigerous segments. Eight or nine abdominal (apodous) segments. Front part of head in ♂ fused with the basal joints of the 2nd antennae to form a clypeus; with paired processes, or a single median process, or without any process. Second antennae in ♂ biarticulate, fused at base. Legs with a single branchial lamina. Rami of caudal furca either fused with last abdominal segment or free. Ovisac short, subglobular.

Europe, Asia, Africa, Australia. In stagnant fresh water.

Only one genus in South Africa.

Gen. BRANCHIPODOPSIS Sars.

1898. *Branchipodopsis*. Sars, Arch. Naturv. Krist., xx, 4, p. 26.

1900. „ Thiele, Zool. Jahrb. syst., xiii, p. 563.

1910. „ Daday, Ann. Sci. Nat., xi, p. 293, and
xii, p. 259.

Nine abdominal segments, the last shorter than the others. Rami of caudal furca falciform, not fused with last abdominal segment. No process arising from vertex of head in ♂, but a small median ventral process between the fused bases of 2nd antennae (sometimes obsolete). Basal joint of 2nd antenna in ♂ with a conical, subconical, or digitiform process on inner anterior side, and a small setiferous lamelliform process near the distal end; 2nd joint uncinat, curved inwards, often contorted, unarmed.

Southern Africa and East Africa; one species in Mongolia.

So far as is yet known the genus occurs in all the geographical provinces, which are here adopted, except Rhodesia and Portuguese East Africa. I have seen specimens from Rietfontein in the Transvaal (Coll. G. E. Hutchinson), but, as they were all females, specific identification was not possible.

This genus is easily recognised by the relatively enormous and strongly chitinated clypeus.



FIG. 4.—Recorded localities of the genus *Branchipodopsis* in South Africa. (See legend to fig. 2.)

Key to the South African species (males).

I. Last abdominal segment without ventral spines.

A. A median ventral process between bases of 2nd antennae. 2nd joint of 2nd antenna falciform.

1. Basal process of 2nd antenna conical on a broad base . . . *hodgsoni*.

2. Basal process cylindrical.

a. Apex of basal process with one point . . . *kalaharensis*.

b. Apex of basal process with three points . . . *natalensis*.

B. No median ventral process. 2nd joint geniculate . . . *simplex*.

II. Last abdominal segment with 2 spines on ventral surface.

A. Median ventral process ovate. 2nd joint of 2nd antenna falciform, or gently curved.

1. Basal process of 2nd antenna with a strong spiniform projection at its base . . . *tridens*.

2. Basal process without a basal projection.

a. Basal process apically trituberculate . . . *wolffi*.

b. Basal process narrow, bilobed . . . *browni*.

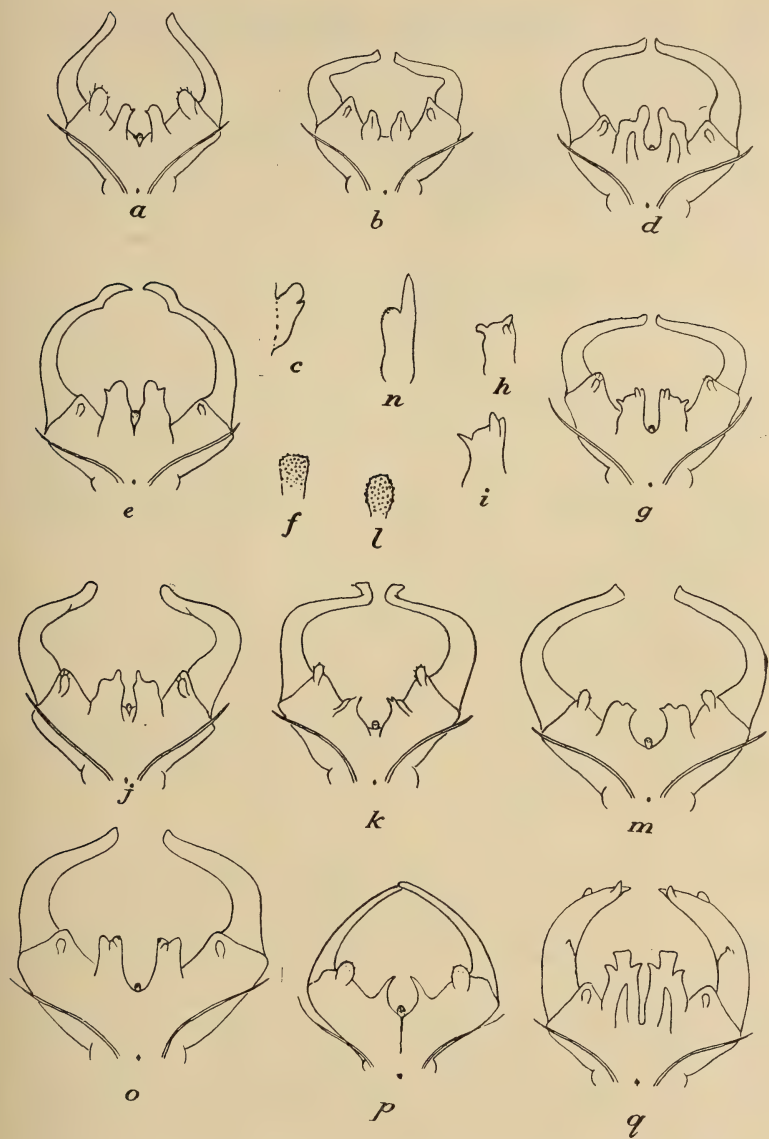


FIG. 5.—*Branchipodopsis*. Clypeus and 2nd antennae of ♂ of : *a*, *browni*; *b*, *c*, *simplex*, with basal process in lateral view; *d*, *tridens*; *e*, *f*, *drepane*, with median process enlarged; *g*, *h*, *i*, *wolffi*, with two variations of the basal process; *j*, *kalaharensis*; *k*, *l*, *hodgsoni*, with median process enlarged; *m*, *n*, *karroensis*, with 2nd antenna of ♀; *o*, *natalensis*; *p*, *scambus*; *q*, *kaokoensis*. (*j* after Daday, others original.)

acute point on inner apical angle; 2nd joint falciform, curved inwards and then forwards near apex. Median ventral process ovate.

Length.—11 mm.

Locality.—Bechuanaland: Kalahari (Daday).

Type in Senckenberg Museum, Frankfurt a/M.

This species is not represented in the South African Museum collections, or in any of the other museum collections in this country which I have seen.

Branchipodopsis natalensis n. sp.

(Text-fig. 5, o.)

Last abdominal segment in ♂ without ventral spines. Basal process of 2nd antenna in ♂ apically bilobed, the lobes subequal, the inner with a minute apical conical tubercle, a coniform lobe on upper side near base of inner lobe; oval flap near apex of 1st joint small; 2nd joint falciform, apex subtruncate. Median ventral process narrow-ovate.

Length.—5 mm.

Colour.—Not recorded.

Locality.—Orange Free State: van Reenen (border of Orange Free State and Natal).

Type in Natal Museum.

I have seen only one ♂ and two ovigerous ♀♀ of this form. In the absence of transitional forms it is not possible to regard it as a variety of any of the other species.

Branchipodopsis simplex Brnrd.

(Text-fig. 5, b, c.)

1924. *Branchipodopsis simplex*. Barnard, Ann. S. Afr. Mus., xx, p. 217, pl. xxvi, figs. 2, 3.

Last abdominal segment in ♂ without ventral spines. Basal process of 2nd antenna ♂ conical, dorsally keeled, with a subterminal notch in the keel; 2nd joint strongly and angularly bent inwards, apex subtruncate. Median ventral process obsolete.

Length.—8 mm.

Colour.—Translucent, ovisac cobalt blue.

Locality.—Ovamboland: Eunda (about 100 miles W.N.W. of Ondongua).

Type in South African Museum.

Branchipodopsis tridens Daday.

(Text-fig. 5, *d.*)

1910. *Branchipodopsis tridens*. Daday, Ann. Sci. Nat., xi, p. 308,
fig. 53.
1924. „ „ Barnard, Ann. S. Afr. Mus., xx,
p. 217.

Last abdominal segment in ♂ with two spines on ventral surface near bases of caudal rami. Basal process of 2nd antenna ♂ conical, apically bilobed, the inner lobe more prominent, subacute, a strong conical spiniform projection arising from base of process; 2nd joint falciform, bent inwards, apex truncate and slightly bifid. Median ventral process ovate, but small and sometimes obsolete.

Length.—Up to 14 mm.

Colour.—Translucent.

Locality.—Cape Province: Papkuil, near Kimberley (Kimberley Mus.); between Upington and Keimoes; Narugas Siding; Bak River (all in the Gordonia District).

Bechuanaland: Kalahari (Daday).

Great Namaqualand: Great Fish River, near Gibeon.

Damaraland: Outjo and Cauas Okawa (Outjo District).

Kaokoveld: Kamanyab.

Type in Senckenberg Museum.

Branchipodopsis wolffi Daday.

(Text-fig. 5, *g, h, i.*)

1910. *Branchipodopsis wolffi*. Daday, Ann. Sci. Nat., xi, p. 304,
fig. 52.
1913. „ „ *Id.*, Voy, Alluaud Afr. Orient. Phyl-
lop., p. 4.
1924. „ „ Barnard, Ann. S. Afr. Mus., xx,
p. 217.

Last abdominal segment in ♂ with 2 ventral spines. Basal process of 2nd antenna ♂ truncate-conical, ending in 3 blunt or acute tubercles, the one on outer lower margin projecting outwards; 2nd joint falciform, curving inwards, apex subtruncate. Median ventral process ovate.

Length.—Up to 15 mm.

Colour.—Translucent, ovisac cobalt blue.

Locality.—Basutoland : Morajia.

Cape Province : Kimberley (Kimberley Mus.).

Bechuanaland : Kalahari (Daday).

Little Namaqualand : Pofadder and T'abanoni.

Great Namaqualand : Great Fish River, near Gibeon.

Damaraland : Waterberg ; Outjo.

Ovamboland : Ongandjera (about 60 miles W. of Ondongua).

Kaokoveld : Kamanyab ; Choabendus.

Distribution.—Kinangop, British East Africa (Daday).

Type in Senckenberg Museum.

This seems to be the most widely spread species of the genus, and the only one which occurs both in Southern and Northern Africa.

There is considerable variation in the shape of the tubercles on the basal process of the 2nd antenna of ♂ ; sometimes the inner is acute and the outer blunt, sometimes *vice versa* ; or the upper tubercle may be very small.

Branchipodopsis browni Brnrd.

(Text-fig. 5, a.)

1924. *Branchipodopsis browni*. Barnard, Ann. S. Afr. Mus., xx, p. 217, pl. xxvi, fig. 4.

Last abdominal segment in ♂ with 2 ventral spines. Basal process of 2nd antenna ♂ bluntly conical, with a small acute point on the inner margin near apex ; oval flap near apex of 1st joint large and only feebly, if at all, setose ; 2nd joint falciform, but not strongly curving inwards, apex subtruncate. Median ventral process ovate.

Length.—10 mm.

Colour.—Translucent.

Locality.—Great Namaqualand : Kalkfontein South.

Type in South African Museum.

Branchipodopsis karroensis n. sp.

(Text-fig. 5, m, n.)

Last abdominal segment of ♂ with 2 ventral spines. Basal process of 2nd antenna ♂ flattened (dorso-ventrally), apically subtruncate with 2 small rounded lobes and an acute point projecting inwards ;

2nd joint falciform, curved inwards, apex subtruncate. Median ventral process ovate. Second antenna of ♀ with a long acute apical process, much greater than in any other species.

Length.—9 mm.

Colour.—Translucent.

Locality.—Cape Province : Hoogeveld, Beaufort West Division.

Type in South African Museum.

Branchipodopsis scambus n. sp

(Text-fig. 5, *p*.)

Last abdominal segment of ♂ with 2 ventral spines. Basal process of 2nd antenna ♂ slender, spiniform, the points curving gently inwards; oval flap near apex of 1st joint large; 2nd joint slender, gently curved, apically subacute. Median ventral process ovate.

Length.—12 mm.

Colour.—(As preserved) yellowish.

Locality.—Cape Province : Grahamstown.

Type in Albany Museum, Grahamstown.

I have seen only a single ♂ of this form, which resembles *browni* in the large size of the oval flap on the 1st joint, but is well distinguished from all the other species by the shape of the 2nd joint of the 2nd antenna.

Branchipodopsis drepane n. sp.

(Text-fig. 5, *e, f*.)

Last abdominal segment in ♂ with 2 ventral spines. Basal process of 2nd antenna ♂ somewhat flask-shaped, apically bilobed, the inner lobe longer and rounded, the outer acute; oval flap near apex of 1st joint very small; 2nd joint falciform, not strongly bent inwards, with a rather sharp kink near apex; apex acute. Median ventral process obovate, slightly wider distally, apically truncate.

Length.—9 mm.

Colour.—Translucent.

Locality.—Great Namaqualand : Great Fish River, near Gibeon.

Type in South African Museum.

A very distinct species, both on account of the form of the 2nd antenna and the shape of the median ventral process. Two male specimens were found among a lot of *B. tridens* and *wolffi*.

Branchipodopsis kaokoensis n. sp.

(Text-fig. 5, q.)

Last abdominal segment in ♂ with 2 large ventral spines. Basal process of 2nd antenna ♂ trilobed, the inner and outer lobes acute, the median one larger, apically truncate, a strong conical spiniform projection arising from base of process; 2nd joint stout, curved, apex bifid, a small conical tubercle on upper (front) surface near middle, and a slightly larger blunt one on anterior margin near apex. Median ventral process obsolete.

Length.—13 mm.

Colour.—Translucent.

Locality.—Kaokoveld: Choabendus (about 115 miles N.W. of Outjo).

Type in South African Museum.

Of this remarkable species I took 1 male and 4 females from a water-hole along with numerous *Streptocephalus cafer*. Although clearly allied to *tridens* it is perfectly distinct. Among the many examples of *tridens*, including some taken on the same expedition at localities further south, which I have examined, I have not seen one with any hint of the development of tubercles on the 2nd joint of the 2nd antenna which might be regarded as a transition form. This joint is, moreover, rather differently shaped in the two species. The bifid apex is merely a stronger development of that found in *tridens*.

FAM. CHIROCEPHALIDAE.

1910. *Chirocephalidae*. Daday, Ann. Sci. Nat., xi, p. 175.

Eleven pedigerous segments. Nine abdominal (apodous) segments. Head in ♂ with or without frontal appendages. Second antennae in ♂ separate at base, biarticulate; both joints either unarmed or with processes of diverse shapes. Legs with one or two branchial laminae. Rami of caudal furca movably articulated with last abdominal segment (except in *Thamnocephalus*). Ovisac more or less flask-shaped.

World-wide, except South America. In stagnant water, fresh or brackish.

Key to the South African genera.

- | | |
|--|--------------------------|
| 1. Second antenna of ♂ uniramous | <i>Branchinella</i> . |
| 2. Second antenna of ♂ biramous | <i>Branchinellites</i> . |

Gen. BRANCHINELLA Sayce.

1840. *Branchipus* (part). M. Edwards, Hist. Nat. Crust., iii, p. 367.

1902. *Branchinella*. Sayce, Pr. Roy. Soc. Vict., n. s., xv, p. 233.

1910. „ Daday, Ann. Sci. Nat., xi, p. 259.

Head in ♂ with frontal appendage. Basal joint of 2nd antenna in ♂ without process, 2nd joint falciform, usually unarmed, rarely with a process at base. Legs with a single branchial lamina.

Europe, N. America, Australia, S. Africa.

Branchinella ornata Daday.

(Text-fig. 6.)

Branchinema ornata. Wolf, in lit.

1910. *Branchinella* „ Daday, Ann. Sci. Nat., xi, p. 266, fig. 40.

The essentials of Daday's description are as follows :—

Frontal appendage in ♂ longer than 2nd antenna, bifurcate for about half its length, each branch with short digitiform processes. Basal joint of 2nd antenna ♂ with 2 short stout tubercles on inner side ; 2nd joint unarmed. Second antenna in ♀ ovate, apically acute. Penis produced, vermiform.

The larger Potchefstroom specimens are characterised thus :

Body smooth as in Daday's specimens. Frontal appendage in ♂ when fully extended nearly twice as long as 2nd antenna, bifurcate, each branch with several long processes, arranged mostly in pairs. Basal joint on 2nd antenna ♂ with a strong pointed tubercle on inner margin, the lower inner apical angle also somewhat produced, the upper inner apical angle produced in a large lamina ; 2nd joint unarmed. First and second abdominal segments ♂ produced downwards in a triangular pointed flap on either side forming the base of the penis. Second antenna ♀ broadly ovate, with minute apical point. Rami of caudal furca in both sexes short, straight, with plumose setae on both margins. Ovisac considerably larger than in Daday's figure.

Length.—♂ and ovigerous ♀, 17 mm. (Daday : 11–12 mm., including caudal furca.)

Colour.—(As preserved) white, ova pinkish brown.

Locality.—Bechuanaland : Kalahari (Daday).

Transvaal : Potchefstroom.

Type in Senckenberg Museum; plesiotype, fully developed, in South African Museum.

The Kalahari specimens were considerably smaller than the Potchefstroom ones, and Daday himself thought that they were not fully

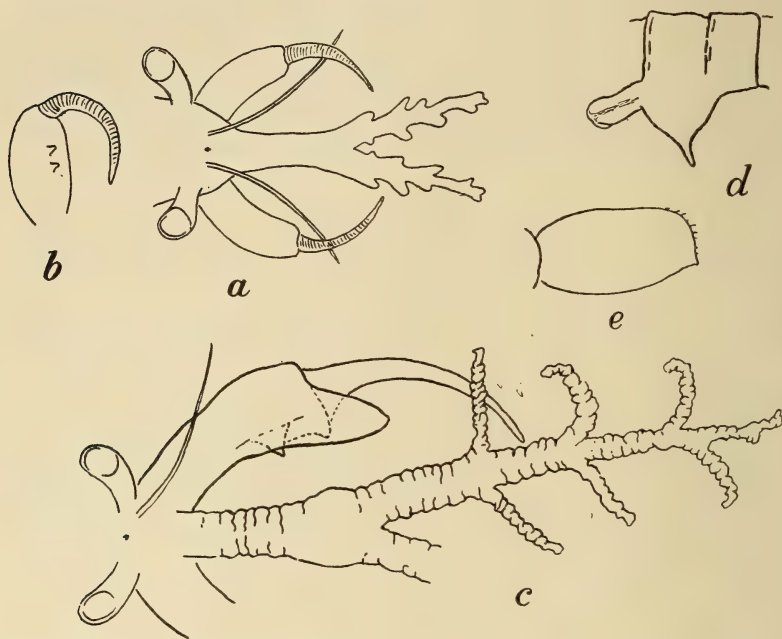


FIG. 6.—*Branchinella ornata* Daday. *a*, Head of ♂; *b*, internal lateral view of 2nd antenna of ♂; *c*, head, frontal process (right branch omitted), and left 2nd antenna of ♂; *d*, lateral view of right penis of ♂; *e*, 2nd antenna of ♀. (*a* and *b* after Daday; *c*, *d*, and *e* original, from the Potchefstroom specimens.)

grown. I think there can be no doubt that the Potchefstroom specimens represent the fully developed form of *ornata*. If, however, they prove eventually to be a separate species, the specific name might well be taken from the appearance of the frontal process when coiled up, resembling a Medusa head.

Gen. BRANCHINELLITES Daday.

1910. *Branchinellites*. Daday, Ann. Sci. Nat., xii, p. 254.

1924. „ Barnard, Ann. S. Afr. Mus., xx, p. 215.

Head in ♂ with bifurcate frontal process, much longer than the 2nd antennae. Basal joint of 2nd antenna in ♂ with a papillose

process at distal end; 2nd joint falciform, without process. Legs with a single branchial lamina. Ovisac flask-shaped.

Japan, Middle Niger, South West Africa, Somaliland.

Branchinellites ondonguae Brnrd.

(Text-fig. 7.)

1924. *Branchinellites ondonguae*. Barnard, Ann. S. Afr. Mus., xx,
p. 216, pl. xxvi, fig. 1.

1925. „ „ Masi, Ann. Mus. Civ. Genova, lii,
p. 97, pl. iii.

Frontal process in ♂ very long, apically twice bifid; basal part with a proximal and a distal group of large spines on each infero-



FIG. 7.—*Branchinellites ondonguae*. Head of male.

lateral margin; second part as far as 1st bifurcation rather shorter than basal part, armed on infero-lateral margins with spines of various sizes; apical part biramous, each ramus again bifurcate, armed with spines of various sizes, the lower ramulus simple (not cheliform). Second antenna in ♂ with large spines on anterior margin of 1st joint, anterior distal angle produced in a coiled process with spiniform papillae on its inner surface; 2nd joint curved, apically somewhat clavate. Second antenna in ♀ slender, apically acute.

Length.—Up to 27 mm.

Colour.—Semitransparent, ♂ whitish, ♀ greenish.

Locality.—Ovamboland : Ondongua and neighbourhood.

Distribution.—Italian Somaliland (Masi).

Type in South African Museum.

Masi has supplemented my description and figure with a good figure of the frontal process in ♂ and with figures of other parts of the animal. In the Somaliland specimens the inner ramulus of the frontal process is nearly twice as long as the outer, whereas in the Ovamboland specimens it is about equal to the outer one.

FAM. STREPTOCEPHALIDAE.

1910. *Streptocephalidae*. Daday, Ann. Sci. Nat., xi, p. 335.

Eleven pedigerous segments. Nine abdominal (apodous) segments, the last always shorter than the others. Head in ♂ simply rounded in front, or with a frontal process. Second antenna ♂ triarticulate, the distal joint cheliform. Legs with a single branchial lamina. Rami of caudal furca movably articulated with last abdominal segment. Ovisac cylindrical, usually elongate.

All continents except South America, but mainly in Africa. In stagnant fresh water.

This family contains only the one genus, remarkable for the form of the 2nd antenna in ♂ and the large number of species.

Daday has subdivided the genus into three subgenera :

1. *Streptocephallus*, with the head in ♂ simply rounded in front or slightly notched, but no proper frontal process.
2. *Streptocephalus* sensu stricto, with a short, simple, frontal process, apically rounded or slightly bifid.
3. *Streptocephalopsis*, with a long, or very long, variously divided or branching frontal process.

This subdivision cannot be maintained. The distinction between the 2nd and 3rd subgenera is not very well defined, *S. rothschildi*, as Daday himself points out, being a transition form. *S. papillatus* is transitional between *purcelli* and *dregei*; and *purcelli* really has a frontal process, albeit very short. Even with our present knowledge of the genus, there are species exhibiting every gradation between the two extreme forms—*purcelli* and *cladophorus*.

It is conceivable that forms, allied to *Streptocephalus* but differing sufficiently to justify generic separation, may be discovered in the future, and it seems a pity that Daday has used up such convenient names as those which he gave to his 1st and 3rd subgenera.

Gen. STREPTOCEPHALUS Baird.

1852. *Streptocephalus*. Baird, Proc. Zool. Soc. London, p. 20.
 1869. *Heterobranchipus*. Verrill, Amer. J. Sci. and Arts, ser. 2, xlviii, p. 250.
 1898. *Streptocephalus*. Sars, Arch. Naturv. Krist., xx, p. 17.
 1910. „ Daday, Ann. Sci. Nat., xi, p. 336.

With the characters of the family.

The 2nd antenna of the ♂ is stated to be three-jointed (Baird, Daday), but there appears to be no evidence of a true division into

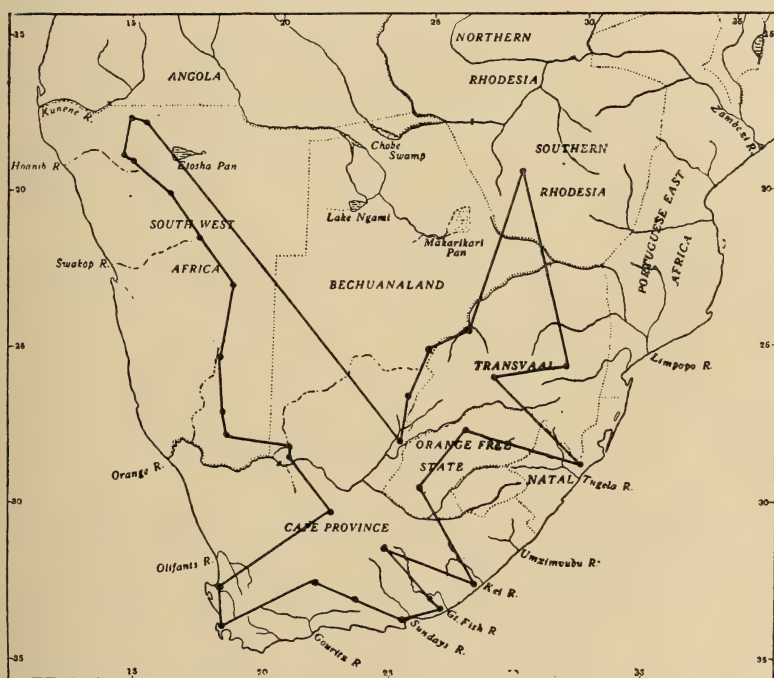


FIG. 8.—Recorded localities of the genus *Streptocephalus* in South Africa. (See legend to fig. 2.)

joints. A study of juvenile specimens, so far as the material has afforded opportunity, also discloses no satisfactory evidence. It would perhaps be more in keeping with the other families to regard this appendage of the *Streptocephalidae* as consisting only of two joints—the 1st comprising the whole of the appendage including the

"thumb" of the chela, the 2nd being the movable "finger." I have therefore avoided the use of the term "joint," as Sars has done.

Some of the growth changes which occur in *purcelli*, *cafer*, *ovamboensis*, and *proboscideus* are illustrated below.

In *purcelli* the finger seems to be immovable, or only slightly movable, though analogy with the other species, and the manner in which the finger there works against the thumb, would lead one to expect the chela to be functional also in *purcelli*. Freshly killed examples, which I have not had the opportunity of examining, would show whether the finger really is movable or not.

Without attaching for the present any particular significance thereto, the fact may perhaps be worthy of note that the species (*purcelli*), with a very feeble frontal process and a very simple "hand" on the 2nd antenna, features which may indicate either primitiveness or secondary simplification, appears to be found only in the extreme south-west of South Africa. On the other hand, those species in which these features are more developed and more complicated appear to be characteristic of more tropical regions. *S. torvicornis*, however, shows that this distinction must not be carried too far.

In many cases males with fully formed 2nd antenna are found with the penis shaped as in fig. 9, g. It is short and straight, with a small process projecting at right angles on the inner side. The fully formed and functional organ is considerably longer, more or less curved or coiled, with two rows of strong serrations on the margin (fig. 9, f).

Key to the South African species.

I. Frontal process in ♂ short or very short.

A. Abdominal segments ♂ smooth. 2nd antenna ♂ without membranous processes or papillae.

1. Frontal process rounded. Finger of chela of 2nd antenna ♂ slender.

a. Last abdominal segment ♂ without lateral process. 2nd antenna ♀ oblong *purcelli*.

b. Last abdominal segment ♂ with lateral process. 2nd antenna ♀ broadly ovate *dendyi*.

2. Frontal process conical. Finger of 2nd antenna ♂ stout *kaokoensis*.

B. Abdominal segments ♂ spinose. 2nd antenna ♂ with processes on middle portion and papillae on both finger and thumb . . . *papillatus*.

II. Frontal process ♂ moderate.

A. A small process on inner side of base of 2nd antenna ♂.

1. Finger of 2nd antenna ♂ flattened at base on anterior margin.

a. Finger tapering, acute *cafer*.

b. Finger apically truncate *dregiei*.

2. Finger angular at base on anterior margin *cirratus*.
- B. No process at base of 2nd antenna ♂.
 1. Anterior and posterior prongs of thumb of 2nd antenna ♂ separated by one or two teeth.
 - a. One short triangular tooth *indistinctus*.
 - b. One narrow tooth *ovamboensis*.
 - c. Two rounded teeth *macrourus*.
 2. Anterior and posterior prongs without any tooth between them ; anterior prong long, posterior prong short. Finger with tooth on hind margin *gracilis*.
- III. Frontal process ♂ very long.
 - A. Frontal process with bifid apex *proboscideus*.
 - B. Frontal process with lateral branch as well as bifid apex . . *cladophorus*.

Streptocephalus purcelli Sars.

(Text-fig. 9.)

1898. *Streptocephalus purcelli*. Sars, Arch. Naturv. Krist., xx, 6, p. 4, pl. i.
1899. " " *Id., ibid.*, xxi, 4, p. 18, pl. ii, figs. 3-5.
1910. " " Stebbing, Ann. S. Afr. Mus., vi, p. 483.
1910. " " Daday, Ann. Sci. Nat., xi, p. 340, fig. 59.
1910. " " var. *sarsi*, *id., ibid.*, p. 342, fig. 60.

♂. Abdominal segments smooth. Rami of caudal furca ensiform, basal half or third of inner margin with long plumose setae, outer margin and distal part of inner margin with simple spiniform setae rather widely spaced. Frontal process very short, broad, and deflexed, apically rounded or minutely notched. Second antenna comparatively short. 1st and 2nd parts setulose, appendix as long as, or longer than, 1st part, tapering to an acute apex ; hand bifurcate, thumb elongate, curved, tapering to a fine point, with a more or less prominent digitiform tooth at its base on outer hind margin ; finger elongate, curved, apically subacute, apparently only slightly or not at all movable.

Juv. ♂. In specimens about 4 mm. long 2nd antenna is a short unjointed appendage, apically bifid (fig. 9, *b*). In specimens 6 mm. long the appendix is present, and the distal portion is approaching the cheliform shape of the adult, but no trace of a division into joints can be discerned (fig. 9, *c*). The rami of the caudal furca are similar to those of the ♀.

♀. Second antenna oblong or oblong-ovate, with an acute apical point. Rami of caudal furca with long plumose setae on both margins. Ovisac long.

Length.—11–25 mm.

Colour.—Translucent.

Locality.—Cape Province: Green Point Common, Cape Town; Stompneus, St. Helena Bay; Stellenbosch.

Type in South African Museum.

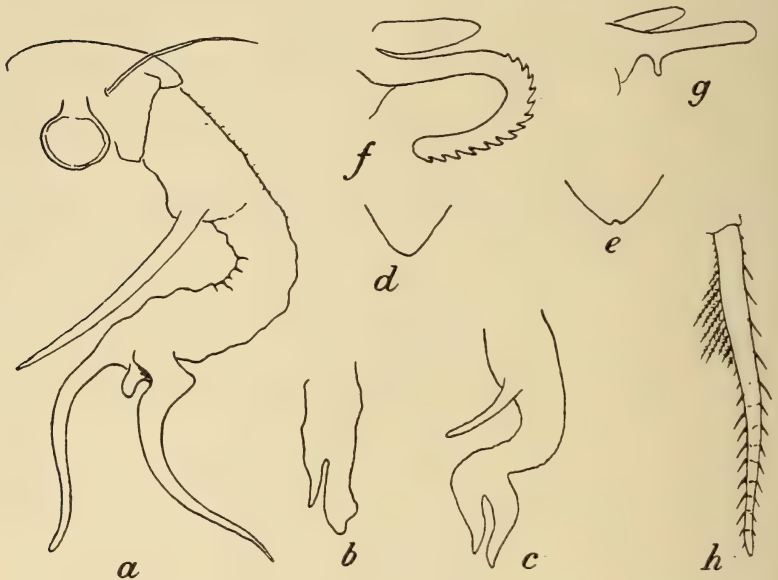


FIG. 9.—*Streptocephalus purcelli* Sars. *a*, Head and left 2nd antenna of adult ♂ (2nd antenna of right side removed); *b*, *c*, similar views of left 2nd antennae of juv. ♂ of 4 mm. and 6 mm. respectively; *d*, *e*, frontal process; *f*, *g*, penis of adult and juv. ♂ respectively; *h*, right ramus of caudal furca of adult ♂.

The ♂ specimen figured by Sars (1899), and regarded by Daday as a distinct variety (var. *sarsi*), appears to be merely an abnormality. The short claw-like process, with its secondary tooth, which takes the place of the usual elongate process, is not correlated with an elongate caudal furca; the latter occurs frequently, in fact more frequently in fully adult typical males than does the rather short form first described by Sars.

This aberration was found in the type locality, Green Point Common, and not at Port Elizabeth as stated in Daday's Monograph.

One other aberration has come to my notice. One of the ♂♂ from

Stompneus has a short conical process on the outside of one of the caudal rami just before the middle.

The Green Point locality has now been converted into a sports ground, and the species no longer occurs there. Nor has it been found in any of the numerous vleis and pans on the Cape Flats.

The Stompneus specimens were raised in the Museum from dried mud.

Streptocephalus dendyi n. sp.

(Text-fig. 10.)

Similar to *purcelli*, but: the small tooth between the thumb and finger of 2nd antenna ♂ obsolete; last abdominal segment ♂ with a

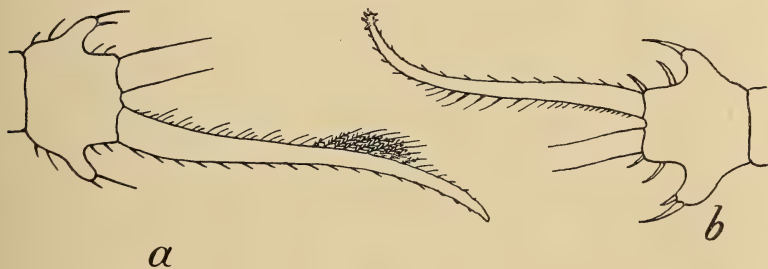


FIG. 10.—*Streptocephalus dendyi* n. sp., last abdominal segment and ramus of caudal furca of ♂: *a*, Cape Town form; *b*, Port Elizabeth form.

lateral setiferous or spiniferous process projecting horizontally and curved backwards; 2nd antenna ♀ obovate, only half as long again as broad, with a minute outwardly curved point in middle of distal margin; rami of caudal furca ♂ with plumose setae only on middle third of inner margin.

Length.—16 mm.

Colour.—Translucent.

Locality.—Cape Province: Rondebosch Camp Ground, Cape Town (S. Afr. Mus.); Thornhill, near Port Elizabeth (Albany Mus.).

Type in the South African Museum.

Collected by the late Professor A. Dendy in 1903. The Port Elizabeth specimens agree with the Cape ones, but the abdominal processes bear spines instead of setae, and the plumose setae are entirely absent on the inner margin of the rami of the caudal furca; the apex of the ramus bears a little cluster of spinules.

Streptocephalus kaokoensis n. sp.

(Text-fig. 11.)

♂. Abdominal segments smooth. Rami of caudal furca stout, straight, both margins with long plumose setae. Frontal process short, deflexed, sharply conical. Second antenna rather short, appendix apically subacute, thumb not spoon-shaped at base, bifurcate, anterior prong long, geniculate, tapering to a fine point, posterior prong about half length of anterior, broad at base, narrowing

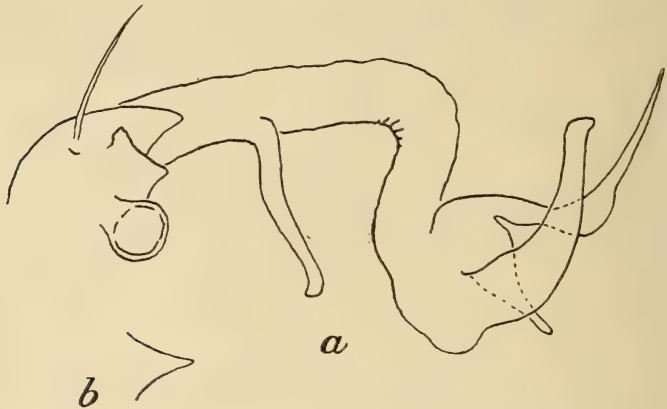


FIG. 11.—*Streptocephalus kaokoensis* n. sp. *a*, Head and left 2nd antenna of ♂ (right 2nd antenna removed); *b*, frontal process in dorsal view.

rather rapidly to a subacute apex, finger movable, stout, curved, apically subtruncate.

♀. Second antenna oblong-ovate, with small apical point. Rami of caudal furca as in ♂. Ovisac short, not extending beyond end of 4th abdominal segment.

Length.—5–6 mm.

Colour.—Translucent.

Locality.—Kaokoveld: N. of Kamanyab.

Type in South African Museum.

As regards the 2nd antenna ♂, this species resembles somewhat the East African *lamellifer* Th. and also *sudanicus* Daday, but the finger has no teeth or spinules on its anterior margin. The short ovisac distinguishes it from all the other South African species.

Streptocephalus papillatus Sars.

(Text-fig. 12.)

1905. *Streptocephalus papillatus*. Sars, Arch. Naturv. Krist., xxvii, 4, p. 4, pl. i.
 1910. „ „ Stebbing, Ann. S. Afr. Mus., vi, p. 483.
 1910. „ „ Daday, Ann. Sci. Nat., xi, p. 343, fig. 61.
 1924. „ „ Barnard, Ann. S. Afr. Mus., xx, p. 218.

♂. Lateral margins of segments 3-7 with numerous small spines and denticles; segment 6 with a strong medio-dorsal recurved bifid



FIG. 12.—*Streptocephalus papillatus* Sars. a, Head and left 2nd antenna of adult ♂ (right 2nd antenna removed); b, frontal process; c, right ramus of caudal furca of adult ♂. (Beaufort West specimen, South African Museum.)

process; segment 7 with a similar but smaller non-bifid process; segment 5 also sometimes with a small medio-dorsal tooth. Rami of caudal furca stout, apically incurved; outer margin with long plumose setae passing into simple acute or digitiform spines apically; inner margin with plumose setae on basal half, followed by strong, apically hispid spines, which diminish in length towards apex. Frontal process short, deflexed, apically shallowly bifid (evidently overlooked by Sars). Second antenna elongate, appendix rather stout, incurved, apically blunt; 2nd part much longer than 1st, with a series of

numerous irregular spiniform or dentiform processes running from base on outer margin and passing over at the bend on to lower margin, where the series ends in 4-5 large teeth; this part then expands and then contracts again before the hand; hand with a basal lamina on each side which, when flexed, embraces the narrow distal portion of the 2nd part of the antenna, thumb elongate, triquetral in section, a strong acute tooth on its anterior basal margin, distally with a series of papillae on the sharp anterior edge, and numerous small tubercles on inner and outer edges of flat posterior surface, finger movable, elongate, with a strong bifid spiniform process on hind margin in basal third, distally triquetral in section, anterior flat surface with a median row of small tubercles, and a series of papillae on inner and outer edges, posterior sharp edge smooth.

♀. Second antenna oblong or oblong-ovate, with apical point. Rami of caudal furca with long plumose setae on both margins. Ovisac long.

Length.—17-22 mm.

Colour.—Translucent.

Locality.—Cape Province: Hanover (Sars); Hoogeveld, Beaufort West Division.

Great Namaqualand: Kalkfontein South.

Type ? in coll. G. O. Sars.

There are none of the original type specimens in the South African Museum. I have only seen specimens from the other two localities noted above.

Streptocephalus cafer (Loven).

(Text-fig. 13.)

1847. *Branchipus cafer*. Loven, K. Vet. Ak. Handl., lxvi (for 1845), p. 433, pl. v, figs. 1-20.

1852. *Streptocephalus cafer*. Baird, Proc. Zool. Soc. Lond., p. 21.

1877. *Branchipus (Streptocephalus) caffer*. Brauer, SB. Ak. Wiss. Wien, lxxv, p. 605.

1910. *Streptocephalus cafer*. Stebbing, Ann. S. Afr. Mus., vi, p. 482.

1910. *Streptocephalus cafer*. Daday, Ann. Sci. Nat., xi, p. 392, fig. 79.

1913. *Streptocephalus propinquus*. Brady, Ann. Natal Mus., ii, p. 470, pl. xxxviii, figs. 2-6.

1924. *Streptocephalus cafer*. Barnard, Ann. S. Afr. Mus., xx, p. 220.

♂. Abdominal segments smooth. Rami of caudal furca nearly straight, both margins with long plumose setae, except the distal

third of inner margin which has about 8-10 strong upstanding spine-setae. Frontal process moderate, deflexed, apically bifid or trifid—if trifid the middle lobe shorter than the others. Second antenna moderate, a membranous flap with serrate lower margin on inner surface near base, appendix rather long, apically subacute; 2nd part with a rather large tooth-like process on inner surface near origin of appendix, followed by several smaller ones, lower margin at bend

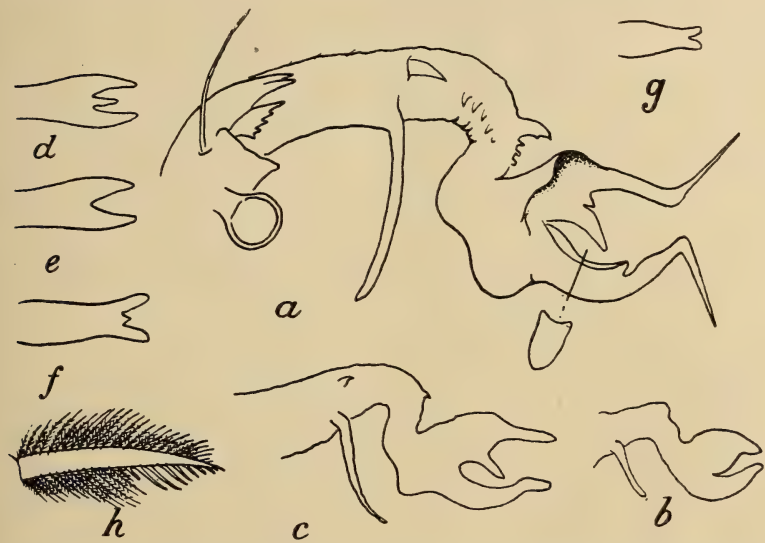


FIG. 13.—*Streptocephalus cafer* (Loven). *a*, Head and left 2nd antenna of adult ♂ (right 2nd antenna removed); *b*, *c*, left 2nd antennae of juv. ♂♂ of 6 and 10 mm. respectively; *d*–*g*, frontal process showing variation, *g* a young specimen; *h*, right ramus of caudal furca of ♂.

with 1 large and 2-3 smaller tooth-like processes, thumb bifurcate, spoon-shaped at base, anterior margin not ending in a tooth, anterior prong long, geniculate, posterior prong short, both apically acute, a short triangular tooth between the two prongs, finger movable, long, geniculate, with a lobe-like tooth on about middle of anterior margin, margin proximal to the tooth flattened.

Juv. ♂. Frontal process bifid, the lobes short. In specimens about 6 mm. long 2nd antenna is short and apparently unjointed, finger and thumb short and simple (fig. 13, *b*); in specimens about 10 mm. long thumb is bifurcate, without the small tooth between the two prongs, finger slightly bent (fig. 13, *c*). Rami of caudal furca as in ♀.

♀. Second antenna oblong, with small apical point. Rami of caudal furca with long plumose setae on both margins, without any spine-setae. Ovisac long.

Length.—14–17 mm. (♂), 12–15 mm. (♀).

Colour.—Translucent.

Locality.—Cape Province : Kimberley (S. Afr. Mus. and Kimberley Mus.).

Bechuanaland : Lobatsi and Asbestos Mts. (J. H. Power).

Orange Free State : Bloemfontein (Daday).

Transvaal : “in paludibus terrae Caffrorum Natalensium” (Loven) (see note below) ; Wolmaranstad.

Zululand : Inkenjeni, near Mahlabatini (*S. propinquus* Brady).

Southern Rhodesia : Bulawayo (S. Afr. Mus. and Rhodesia Mus.).

Great Namaqualand : Great Fish River, near Gibeon.

Damaraland : Otjiwarongo ; Altmark and Otjikondo (Outjo District).

Kaokoveld : Choabendus.

Type in Stockholm Museum ; of *propinquus* in coll. Brady ?.

It seems likely that *propinquus* is a synonym of this species. Brady makes no mention of the frontal process or the appendage at base of the 2nd antenna. The figure of the 2nd antenna ♂ corresponds well with that of *cafer*, but shows a projecting tooth on the anterior margin of the anterior prong of the thumb similar to that in *indistinctus*. Brady considered his specimens were probably not adult ; the figure of the short ovisac, and the absence of a short tooth between the two prongs of the thumb in ♂, confirm this conclusion.

This is the most widely distributed species of the genus in South Africa. The locality given by Loven and quoted by Stebbing, “Natal, lat. $26\frac{1}{2}^{\circ}$ S., long. 29° E., on the road from Port Natal to the salt pan of Makkalis Mt., between Crocodile and Ap rivers,” obviously contains a contradiction. According to the latitude and longitude the locality would be in the Transvaal, to which also Makkalis Mt. (=Maghaliesberg) points ; though the latitude and longitude are again wrong for the Maghaliesberg between the Crocodile and Aapiers rivers. But in either case Natal is excluded.

Streptocephalus dregei Sars.

(Text-fig. 14.)

1899. *Streptocephalus dregei*. Sars, Arch. Naturv. Krist., xxi, 4,
p. 19, pl. ii, figs. 6–10 (♂).
1904. „ „ Gurney, Proc. Zool. Soc., 1904, ii,
p. 298, pl. xviii, figs. 1, 2 (♀).
1910. „ „ Stebbing, Ann. S. Afr. Mus., vi,
p. 483.
1910. „ „ Daday, Ann. Sci. Nat., xi, p. 377,
fig. 4.

♂. Abdominal segments 3–7 with several (up to about 8) small spines on hind margin—those on segments 3 and 4 laterally, those

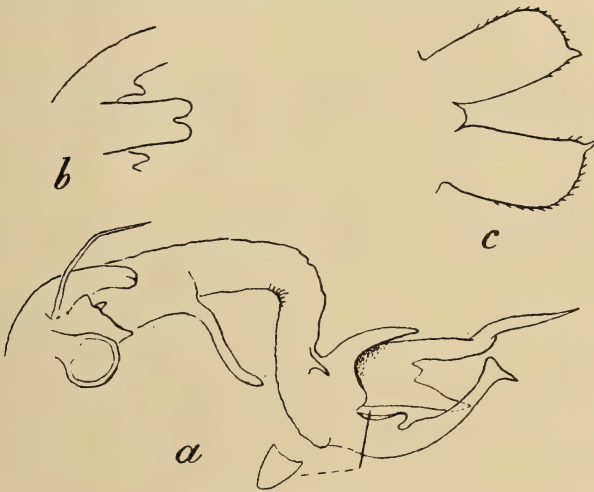


FIG. 14.—*Streptocephalus dregei* Sars. *a*, Head and left 2nd antenna of ♂ (right 2nd antenna removed); *b*, frontal process and base of 2nd antenna of ♂, showing appendage; *c*, 2nd antennae of ♀.

on segments 5–7 dorsally and dorso-laterally, and those on segments 5–7 more prominent than the others; spines obscure in immature specimens. Rami of caudal furca ensiform, outer margin with long plumose setae, inner with a small patch of plumose setae at base, followed by numerous close-set spiniform setae of varying length. Frontal process deflexed, about as long as head, apically bifid, sometimes “simple” or rounded, as stated by Sars and Daday. Second antenna moderate, a small and often obscure membranous appendage

on inner side at base, appendix incurved, apically subacute ; a tooth-like process on inner side near base of hand ; thumb bifurcate, spoon-shaped at base, anterior margin ending in a tooth, the anterior prong long, apically acute, with a bend or twist in middle ; posterior prong shorter, apically acute ; between them a short triangular tooth ; finger movable, curved, with a lobe-like tooth at base on anterior margin, proximal to which the margin is flattened ; apex truncate and expanded like a foot.

♀. Second antenna oblong, with apical point. Rami of caudal furca with long plumose setae on both margins. Ovisac long.

Length.—Up to 23 mm. (♂), 22 mm. (♀).

Colour.—Translucent, caudal furca red (Gurney).

Locality.—Cape Province : Port Elizabeth (Sars) ; Willowmore ; Blaauwkrantz, near Kowie Road ; King Williams Town (Albany Mus. and Transvaal Mus.) ; Grahamstown (Albany Mus.).

Orange Free State : Kroonstad (Gurney).

Type ♂ in South African Museum, ♀ in British Museum.

Streptocephalus cirratus Daday.

(Text-fig. 15.)

1907. *Streptocephalus cirratus*. Daday, Ann. Sci. Nat., ser. 9, vii, p. 142, fig. 4.

1910. „ „ *Id.*, *ibid.*, xi, p. 358, fig. 67.

Extremely close to *dregei*. ♂.—Spines present only on abdominal segments 5–7, more numerous and closely set. Rami of caudal furca with papilliform and less closely set processes along whole of inner margin from base to apex. Basal membranous appendage on 2nd antenna longer, apically bifid or entire, no tooth on inner side near base of hand, finger and both prongs of thumb shorter and stouter, finger with no tooth at base and anterior margin sharp ; sometimes a blunt tooth on anterior margin. ♀.—Second antenna ovate, apically incised, no apical point (Daday), or of the shape normal in the genus.

Length.—14–24 mm.

Locality.—Cape Province : Potfontein, N. of De Aar.

Orange Free State : Bloemfontein (Daday).

Transvaal : Rietfontein (between Johannesburg and Pretoria) ; Heidelberg.

Type in Paris Museum.

A large ♂ (24 mm.) from Potfontein is typical. I have seen females

taken with males at Rietfontein and Heidelberg. The males are typical, except that the basal membranous appendage on the 2nd antenna is entire and not bifid, and the finger of the "hand" has a

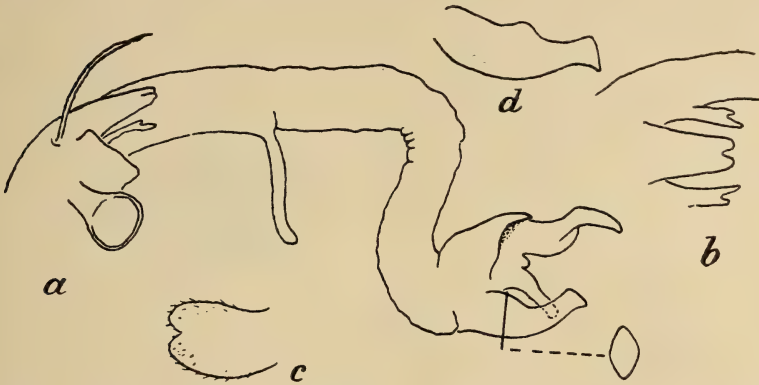


FIG. 15.—*Streptocephalus cirratus* Daday. *a*, Head and left 2nd antenna of ♂ (right 2nd antenna removed); *b*, frontal process and appendage at base of 2nd antenna of ♂; *c*, 2nd antenna of ♀; *d*, finger of 2nd antenna of ♂. (*a*, *b*, Potfontein specimen, *d* Rietfontein specimen, *c* after Daday.)

blunt tooth on its anterior margin (fig. 15, *d*). The females have the 2nd antenna ovate with an apical point (as is normal in the genus). In a few specimens there was a very slight notch adjoining the apical point; and, although Daday had several specimens, I cannot help thinking that the deeply incised antenna as figured by him is an abnormal peculiarity.

Streptocephalus indistinctus Brnrd.

(Text-fig. 16.)

1924. *Streptocephalus indistinctus*. Barnard, Ann. S. Afr. Mus., xx, p. 221.

♂. Abdominal segments smooth. Rami of caudal furca straight, both margins with long plumose setae. Frontal process moderate, deflexed, stout, apex truncate and slightly emarginate. Second antenna moderate, appendix rather long, tapering, apex subacute; a rather large tooth-like process on inner side near origin of appendix, followed by several smaller ones, another larger near base of hand, the small intermediate ones varying considerably, sometimes obsolete; thumb bifurcate, spoon-shaped at base, anterior margin ending in a

tooth, anterior prong long, geniculate, tapering to an acute point, posterior prong shorter, apically acute, between them a short triangular tooth; finger movable, long, geniculate, apically acute, with a slight notch followed by a lobe-like tooth on anterior margin, proximal to which margin is sharp.

♀. Second antenna oblong, with apical point. Rami of caudal furca as in ♂. Ovisac long.

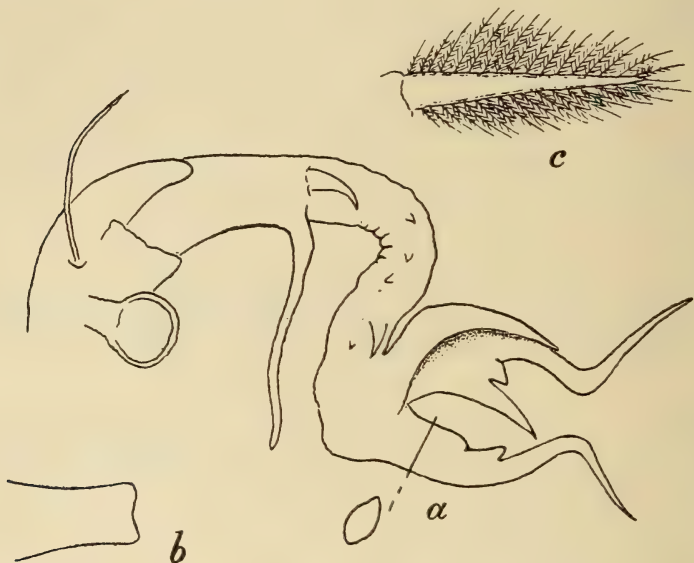


FIG. 16.—*Streptocephalus indistinctus* Brnrd. a, Head and left 2nd antenna of ♂ (right 2nd antenna removed); b, frontal process; c, right ramus of caudal furca.

Length.—18 mm. (♂), 14 mm. (♀).

Colour.—Translucent, more or less violet, caudal furca orange.

Locality.—Transvaal: junction of Marico and Crocodile rivers.

Great Namaqualand: Kalkfontein South.

Ovamboland: several localities (Barnard, 1924).

Type in South African Museum.

Closely allied to *distinctus* Th. from Madagascar, but differing in the rami of the caudal furca not having finely tapering apices set with spinules.

S. propinquus Brady may possibly be the same as this species and not a synonym of *cafer*; but see under *cafer*.

Streptocephalus ovamboensis Brnrd.

(Text-fig. 17.)

1924. *Streptocephalus ovamboensis*. Barnard, Ann. S. Afr. Mus., xx, p. 220.

♂. Abdominal segments smooth. Rami of caudal furca stout, straight, both margins with long plumose setae, the setae not diminishing in length towards apex, but continuing of about the same length around the apex. Frontal process strong, deflexed, apically obtusely

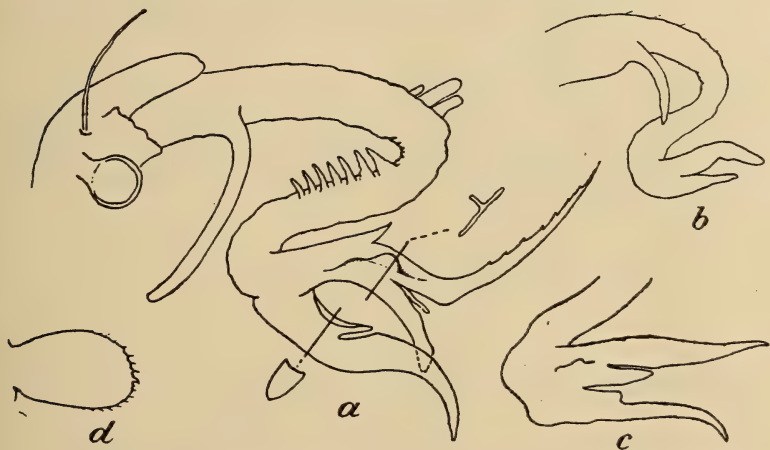


FIG. 17.—*Streptocephalus ovamboensis* Brnrd. a, Head and left 2nd antenna of adult ♂ (right 2nd antenna removed); b, c, left 2nd antennae of juv. ♂ of 10 mm. and 12 mm. respectively; d, left 2nd antenna of ♀.

rounded or truncate. Second antenna rather long, appendix long, apically subacute, middle part with several tooth-like processes on upper margin beyond the bend, and 2-3 large digitiform processes on anterior margin at the bend; thumb bifurcate, moderately broad at base, inner margin of spoon-shaped hollow ending in a rounded lobe projecting inwards at right angles, anterior margin with a tooth, anterior prong long, geniculate, tapering to an acute point, the upper margin serrate, posterior prong shorter, apically blunt, between the prongs a narrow digitiform process or tooth; finger movable, stout, arcuate, the acute apex curving posteriorly, a lobe-like tooth followed by a narrow notch on anterior margin, proximal to which the margin is flattened.

Juv. ♂. Specimens 10 mm. long have the hand simply bifurcate (fig. 17, *b*); specimens 12 mm. long have the anterior prong of the thumb bifid, the finger slightly curved, with incipient basal tooth (fig. 17, *c*).

♀. Second antenna broadly ovate, with apical point. Rami of caudal furca as in ♂. Ovisac long.

Length.—18 mm. (♂), 16 mm. (♀).

Colour.—♂ translucent, ♀ light brownish; caudal furca bright orange, especially in ♀.

Locality.—Cape Province: Hanover; Gordonia District.

Bechuanaland: Moloppo River (Kimberley Mus.).

Great Namaqualand: Keetmanshoop.

Ovamboland: Ukualonkathi (about 100 miles N.W. of Ondongua).

Type in South African Museum.

This species is closely allied to *torvicornis* Waga and its varieties, but is distinguished by the narrow process between the two prongs of the thumb and the form of the basal part of the finger of 2nd antenna (♂).

Streptocephalus macrourus Daday.

(Text-fig. 18.)

1907. *Streptocephalus macrourus*. Daday, Ann. Sci. Nat., vii, p. 143, fig. 5.

1910. „ „ *Id.*, *ibid.*, xi, p. 383, fig. 76.

1924. „ „ Barnard, Ann. S. Afr. Mus., xx, p. 219.

♂. Abdominal segments smooth. Rami of caudal furca elongate, slender, outer margin with short plumose setae, basal half of inner margin with longer closely set plumose setae resembling a brush, distal half with rather widely spaced spine-setae of various lengths. Frontal process moderate, deflexed, apex subacutely pointed. Second antenna moderately long; appendix long, slender, apically subacute, no processes on middle part of antenna; thumb bifurcate, basally spoon-shaped, anterior margin ending in a long spine-like tooth, anterior prong long, geniculate, tapering to an acute point, posterior prong short, apically acute, between the two prongs two short rounded teeth; finger movable, long, basally thickened, its anterior margin sharp, and ending in a lobe-like tooth, apex subacute or subtruncate.

♀. Rami of caudal furca shorter and stouter than in ♂, both margins

with long plumose setae. Second antenna oblong, with a minute, often obsolete, apical point. Ovisac long.

Length.—15–22 mm. (♂), 18–20 mm. (♀).

Colour.—Translucent; ♂ often pale sea-green, ♀ usually violet; caudal furca bright orange or red, especially in ♀.

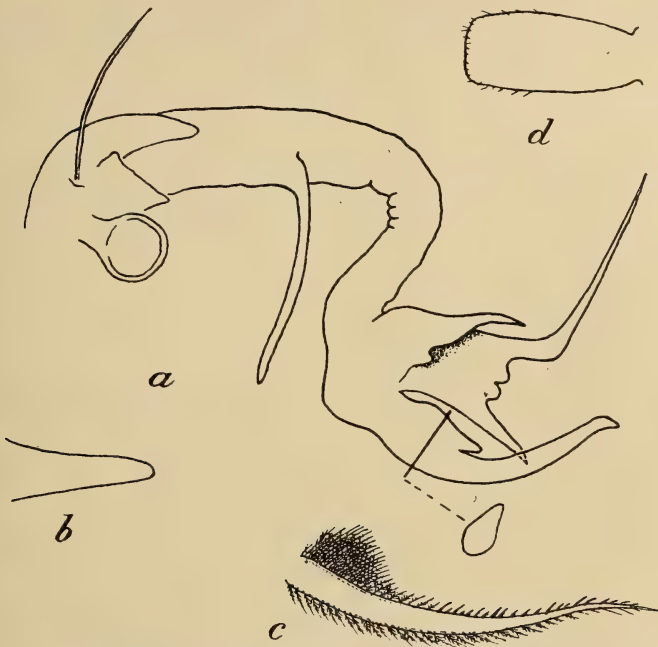


FIG. 18.—*Streptocephalus macrourus* Daday. *a*, Head and left 2nd antenna of ♂ (right 2nd antenna removed); *b*, frontal process; *c*, left ramus of caudal furca of ♂; *d*, 2nd antenna of ♀.

Locality.—Cape Province: Kimberley (S. Afr. Mus. and Kimberley Mus.).

Orange Free State: Bloemfontein (Daday and Albany Mus.).

Transvaal: junction of Marico and Crocodile rivers.

Ovamboland: several localities (Barnard, 1924).

Type ♂ in Paris Museum, ♀ in South African Museum.

Easily distinguished by the long caudal furca and the *two rounded* teeth between the two prongs of the thumb of 2nd antenna in ♂.

Streptocephalus gracilis Sars.

(Text-fig. 19.)

1898. *Streptocephalus gracilis*. Sars, Arch. Naturv. Krist., xx, 4,
p. 17, pl. ii.
1910. „ „ Stebbing, Ann. S. Afr. Mus., vi,
p. 483.
1910. „ „ Daday, Ann. Sci. Nat., xi, p. 352,
fig. 65.

♂. Abdominal segments with numerous small asperities on dorsal surface. Rami of caudal furca stout, ensiform, both margins with

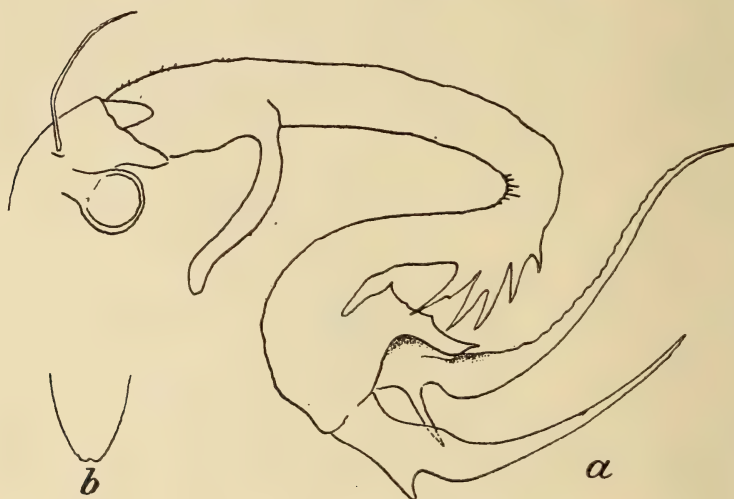


FIG. 19.—*Streptocephalus gracilis* Sars. a, Head and left 2nd antenna of ♂ (right 2nd antenna removed); b, frontal process.

long plumose setae, except near apex on inner margin where the setae are simple, short, spiniform. Frontal process short, deflexed, conical, apically obtuse or minutely notched. Second antenna moderate, basal part minutely setulose, appendix apically subtruncate, middle part with a series of small dentiform processes on outer and lower margins (Daday; not present in the type, and not mentioned by Sars), lower margin just beyond bend with 4-5 large teeth, thumb bifurcate, anterior margin angular and ending in a tooth, anterior prong long, slender, arcuate, upper margin crenulate, posterior prong

short, acute, finger movable, long, tapering to an acute apex, a strong tooth on posterior margin near base.

♀. Second antenna oblong, with apical point. Rami of caudal furca with plumose setae on both margins. Ovisac long.

Length.—13 mm.

Colour.—Translucent, caudal furca not coloured (Sars).

Locality.—Cape Province : Port Elizabeth (Sars).

Type in South African Museum.

Streptocephalus proboscideus (Frfd.).

(Text-fig. 20.)

1873. *Branchipus* (*Streptocephalus*) *proboscideus*. Frauenfeld, Verh. k.k. zool. bot. Ges. Wien, xxiii, p. 189.
1877. ,, ,, *proboscideus*. Brauer, SB. Ak. Wiss. Wien, lxxv, p. 602, pl. vi, figs. 13, 14.
1910. *Streptocephalus proboscideus*. Daday, Ann. Sci. Nat., xi, p. 395, fig. 80.
1921. ,, ,, Pesta, Ann. Naturh. Mus. Wien, xxxiv, p. 96.
1924. ,, ,, Barnard, Ann. S. Afr. Mus., xx, p. 221.

♂. Abdominal segments smooth. Rami of caudal furca rather stout, ensiform, with rather short plumose setae on both margins. Frontal process long, deflexed, and coiled backwards in repose, with a single or double row of spiniform processes on lower margin varying in number and size, apex bifid, with short tuberculiform knobs, which are also variable in development. Second antenna long, a few small tooth-like processes on inner surface of basal part; appendix rather long, slender, apically acute, some large tooth-like processes on middle part at and beyond the bend, and one or more near junction with hand; thumb bifurcate, basally spoon-shaped, anterior margin ending in a tooth, anterior prong long, geniculate, tapering to an acute apex, posterior prong short, apically acute, between the two prongs a short triangular tooth; finger movable, geniculate, basal half stout, with two large lobe-like teeth on anterior margin, distal half slender, apically acute.

Juv. ♂. Specimens 8 mm. long have a short frontal process apically

notched (similar to that of adult *dregei*), 2nd antenna short, with simple thumb and finger (similar to that of young *cafer*); specimens 10 mm. long have the frontal process reaching just beyond end of basal part of 2nd antenna, without processes, apex bifid (fig. 20, *e*), 2nd antenna with thumb bifurcate and basal teeth on finger beginning to show (fig. 20, *b*); specimens 12 mm. long have the frontal process reaching to bend of 2nd antenna, but without or with very small processes on lower margin, hand nearly like that of adult but finger and anterior prong of thumb not geniculate (fig. 20, *c*).

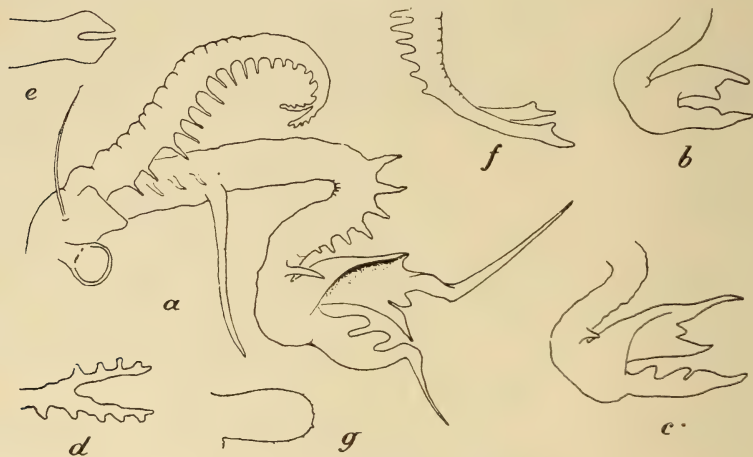


FIG. 20.—*Streptocephalus proboscideus* (Frfd.). *a*, Head and left 2nd antenna of adult ♂ (right 2nd antenna removed); *b*, *c*, left 2nd antennae of juv. ♂ of 10 mm. and 12 mm. respectively; *d*, normal apex of frontal process; *e*, apex of frontal process of juv. ♂ of 10 mm.; *f*, apex of frontal process of a Lake Chrissie specimen; *g*, left 2nd antenna of ♀.

♀. Second antenna ovate, with minute apical point. Rami of caudal furca similar to those of ♂. Ovisac long.

Length.—13–29 mm. (♂), 12–24 mm. (♀).

Colour.—Translucent, caudal furca orange.

Locality.—Cape Province: Molopopo River, 45 miles N. of Upington; Achabdam (Gordonia District).

Damaraland: Gobabis (Kimberley Mus.).

Ovamboland: Onambeke, S.W. of Ondongua.

Transvaal: Lake Chrissie; Benoni; Heidelberg.

Distribution.—Chartoum (Sudan).

Type in Vienna Museum.

In the South African Museum specimens the processes on the lower

side of the "proboscis" are arranged sometimes in a single row, sometimes irregularly or more or less in two rows, seldom so definitely in two rows as in the Sudan specimen figured by Brauer.

The specimens collected by myself at Achabdam are the largest I have seen, not only of this species but of any of the South African species.

Streptocephalus cladophorus Brnrd.

(Text-fig. 21.)

1924. *Streptocephalus cladophorus*. Barnard, Ann. S. Afr. Mus., xx, p. 222.

♂. Abdominal segments smooth. Rami of caudal furca rather short, straight, with long plumose setae on both margins. Frontal

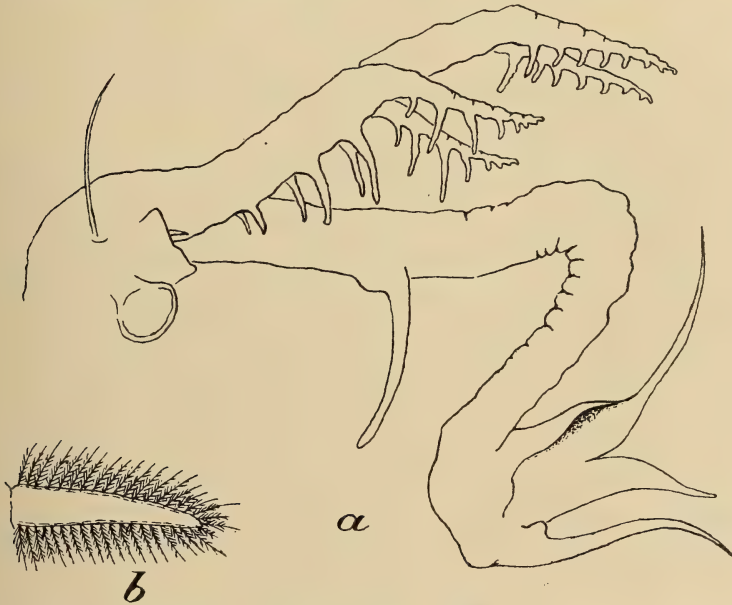


FIG. 21.—*Streptocephalus cladophorus* Brnrd. *a*, Head and left 2nd antenna of ♂ (right 2nd antenna removed); *b*, right ramus of caudal furca.

process elongate, apically bifid, and with a lateral branch about half-way along, lower margins with spiniform processes. Second antenna long, a very small acute process on inner surface at base (not mentioned in original description), appendix apically subacute, thumb bifurcate, basally spoon-shaped, the anterior margin not ending

in a tooth, anterior prong tapering to a long fine point, posterior prong shorter, apically acute, finger movable, long, slender, curved, apex acute, a rounded tooth on anterior margin at base, and sometimes another similar one about half-way along.

♀. Second antenna oblong, with small apical point. Rami of caudal furca similar to those of ♂. Ovisac long.

Length.—11–14 mm.

Colour.—Translucent, with various shades of pale blue, blue-green, or violet; colour in ♀ brighter than in ♂; caudal furca bright orange.

Locality.—Cape Province: Vryburg.

Transvaal: Heidelberg.

Ovamboland: various localities (Barnard, 1924).

Type in South African Museum.

ORDER 2. NOTOSTRACA.

1867. *Notostraca*. Sars, Crust. d'eau douce Norv., pp. 5, 6.

1902. *Notophylla*. Stebbing, Encycl. Brit., ed. 10, vol. xxviii (Suppl., vol. iv), p. 269.

Body elongate, more or less covered dorsally with a broad shield-like carapace which is attached anteriorly to the head, tapering posteriorly, and ending in a long, caudal furca. A varying number of the posterior segments without legs (apodous). Two sessile compound eyes close together on dorsal surface of head, with a minute obscure ocellus in front of them. Antennae greatly reduced or absent. Trunk-limbs (legs), 40–63 pairs, of which 29–52 are post-genital; the first pair with the endites filiform, often very long. The rami of the caudal furca very long, multiarticulate. Genital ducts opening on the 11th segment. Ova retained in a capsular ovisac formed by the 11th pair of trunk-limbs. No special prehensile organs in the male. Young hatched in the Metanauplius stage.

Distribution world wide. Males sometimes much rarer than females.

FAM. APODIDAE.

1834. Burmeister, Organization of Trilobites.

1892. Bernard, The Apodidae, Nature Series, London.

1896. Sars, Fauna Norvegiae, i, p. 67.

(Sometimes incorrectly written *Apusidae*.)

With the characters of the order.

There are two well-known genera: *Apus* and *Lepidurus*. In 1921

a third, *Proterothriops*, was proposed by Ghigi, but Gurney has given reasons for not admitting this genus, and for not splitting up the genus *Apus* without a very thorough consideration of individual and local variation based on a large amount of material (1924, p. 566). Gurney's remarks are here endorsed.

Key to the genera.

1. Last abdominal segment (telson) produced as a supra-anal plate *Lepidurus*.
2. Telson not produced *Apus*.

Gen. LEPIDURUS Leach.

- | | | |
|-------|--------------------|--|
| 1816. | <i>Lepidurus</i> . | Leach, Dict. des Sci. Nat., i, p. 259. |
| 1883. | „ | Packard, U.S. Geol. Geogr. Surv. Territ., xii, p. 315. |
| 1896. | „ | Sars, Fauna Norv., i, p. 67. |
| 1917. | „ | Herriott, Trans. New Zeal. Inst., xlix, p. 284 (habits, etc.). |
| 1921. | „ | Ghigi, Atti. Soc. Ital. Sci. Nat., lx, pp. 178, 182. |
| 1924. | „ | Henry, Proc. Linn. Soc. N.S.W., xlix, p. 123. |

Carapace very large, as a rule leaving only the last few segments exposed. Last segment (telson) produced as a thin, flat, supra-anal plate between the caudal filaments. First pair of legs with comparatively short endites, scarcely projecting beyond edge of carapace. Never more than 8 apodal segments. Ova larger than in *Apus*.

Lepidurus and *Apus* are well differentiated on the above structural characters, but there is also a very interesting biological difference between the two genera.

By means of breeding experiments, Brauer (SB. K. Ak. Wiss. Wien, lxxv, p. 586 *et sqq.*, 1877) found that the ova of *Lepidurus* were unable to develop if they were desiccated, whereas in the case of *Apus* desiccation was a necessary condition without which the eggs would not hatch. He found that the eggs of *Apus* can be exposed to the hottest sun without harm, but that those of *Lepidurus* will not hatch if allowed even to become dry; and also that *Lepidurus* needs a low temperature (not higher than 17.5° C.) for its development, while *Apus* can endure a considerably higher temperature. He shows that in Europe *Lepidurus* is confined to peat moors and bogs which never dry up.

Miss Herriott was evidently unaware of any of Brauer's papers,

otherwise she would have recognised the probable explanation why the eggs of *Lepidurus viridis* did not hatch in her laboratory (*loc. cit.*, p. 286).

Although not since repeated and confirmed, one cannot doubt Brauer's results, seeing that they explain so convincingly the marked contrast in the present-day habitats and distribution of the two genera. *Lepidurus* is confined to the more boreal portions of the Palaearctic and Nearctic regions, New Zealand, Tasmania, the south-west and south-east coastal belts of Australia and Patagonia. In regions of a hotter and more arid climate, subject to periodical droughts, it is replaced by *Apus*. The limits of distribution of the two genera overlap in places, but in general the above marked separation holds good.

In Africa the only *Lepidurus* yet recorded is a fossil form from the Cave Sandstone Beds of the Stormberg Series of Upper Triassic age. This occurrence is extremely interesting. Haughton (*loc. cit.*, *infra*, pp. 469, 478) considers that the climate at the commencement of Stormberg times was cool with a discontinuous rainfall, and that there was a gradual change towards semi-arid and arid conditions throughout the deposition of the Stormberg Series. A wholesale extinction of invertebrate life must have taken place during the succeeding outpouring of the Stormberg (Drakensberg) lavas.

† *Lepidurus stormbergensis* Htn.

1924. *Lepidurus stormbergensis*. Haughton, Ann. S. Afr. Mus., xii, p. 328, and pp. 449, 481.

Carapace (as preserved, *i.e.* flattened out) almost circular, but its length (including posterior angles) slightly greater than its breadth, posterior sinus deep, its margin without visible denticulation, median keel moderate or strong.

About 14–17 segments exposed behind carapace; number of apodal segments apparently 7–8, each with 6–9 spines.

Telson equal to the last 3–4 segments together, spatulate or lanceolate, the apex being rounded or pointed, with well-marked medio-dorsal keel which is not visibly dentate.

Caudal rami at least as long as length of carapace, covered with fine setae as in recent species.

First pair of legs short, not projecting beyond edge of carapace.

Total length of carapace.—Up to 19 mm.

From shale band in the Cave Sandstone, Stormberg Series, Wodehouse, Cape Province.

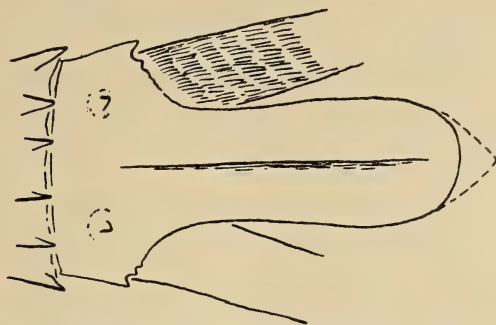


FIG. 22.—Restoration of telson of *Lepidurus stormbergensis* Htn.
(from specimens 5754, 5762, 5763).

Gen. APUS Schfr.

- 1756. *Apus*. Schaeffer, Monogr. d. krebsart. Kieferf., p. 131.
- 1798. „ Cuvier, Tabl. élém., pp. 454 and 700 (emend. pro *Apos* Scop.).
- 1801. „ Latreille, Hist. nat. Crust., iv, p. 186.
- 1802. „ Bosc, Crust., ii, p. 244 (emend. pro *Apos* Scop.).
- 1803. *Triops* and *Triopes*. Schrank, Fauna Boïca, iii, p. 251.
- 1841. *Apus*. Zaddach, De Apodis cancriformis anat.
- 1873. „ Brauer, Verh. zool. bot. Ges. Wien, xxiii, p. 193 (biology).
- 1877. „ *Id.*, SB. Ak. Wiss. Wien, lxxv, p. 583 (biology).
- 1883. „ Packard, U.S. Geol. Geogr. Surv. Territ., xii, p. 319.
- 1886. „ Simon, Ann. Soc. ent. Fr., ser. 6, vol. vi, p. 423.
- 1909. *Triops*. Keilhack, Zool. Ann. Wurzburg., iii, p. 177.
- 1910. *Apus*. Stebbing, Ann. S. Afr. Mus., vi, p. 484.
- 1911. „ Kemp, Rec. Ind. Mus., vi, p. 353.
- 1921. *Thriops*. Ghigi, Att. Soc. Ital. Sci. Nat., lx, p. 162.
- 1921. *Proterothriops*. *Id.*, *ibid.*, p. 166.
- 1923. *Apus*. Gurney, Ann. Mag. Nat. Hist., (9), xi, p. 496.
- 1923. *Thriops*. Colosi, Att. Soc. Ital. Sci. Nat., lxii, p. 75.
- 1923. *Proterothriops*. *Id.*, *ibid.*, p. 81.
- 1924. *Thriops*. Ghigi, *ibid.*, lxiii, p. 193.
- 1924. *Apus*. Gurney, Ann. Mag. Nat. Hist., (9), xiv, p. 559.

It is quite clear that, according to the strict application of the Law of Priority, *Apus* should be applied to a genus of birds; but

common usage and common sense, as Gurney argues, should be regarded in this case as outweighing other considerations, especially as the names *Cypselus* (or *Micropus*), *Cypselidae*, etc., are well established in ornithology.

Carapace not as large as in *Lepidurus*, leaving more of the segments exposed. No telsonic supra-anal plate. First pair of legs with very long endites. Frequently more than 8 apodal segments. Ova smaller than in *Lepidurus*.

Apus has a nearly world-wide distribution, inhabiting regions which are more or less arid and subject to periodical droughts. It seems to prefer muddy water in contrast to *Lepidurus*, which prefers clear water.

Land and freshwater animals are frequently subject to considerable variation, both individual and local, and systematists are confronted with a great abundance of forms which it is difficult to classify into sharply defined species. *Apus* affords a good example of such variation and taxonomic difficulties. Nearly all authors agree as to the extreme difficulty of finding clear-cut specific characters by which to distinguish examples from different parts of the world. Several "species" have been described from inadequate material or even single specimens. This procedure of describing "specimens" and not "species" is bound to cause confusion, and its aftermath of "specific" names sunk in synonymy. The difficulties arise when later students try to identify their material, and fit their specimens into the already described species.

In the following pages some account is given of a study of the variation in a fairly considerable amount of material from several localities in South Africa. Approximately 500 specimens have been examined, and special attention has been paid to the variation found in batches of specimens collected at one and the same time and place. The amount of material is really small compared with what is desirable in dealing with variable characters; but it seems to be larger than any hitherto studied by other authors, and the results may be considered as having a certain value.

Dealing first with variations in characters which have been regarded as significant for diagnostic purposes, we find :

1. The shape of the carapace as shown by the two extreme forms—oval in *numidicus* and round in *namaquensis*—is constant. I have not seen any transitional forms. Taken in conjunction with other characters as well, this feature may certainly be used in a specific diagnosis; but it is quite valueless as applied to other species, e.g. *numidicus* and *sudanicus*.

2. The surface of the carapace may be perfectly smooth and polished, finely shagreened, minutely granular, or covered with closely set or scattered prickles or asperities, either wholly or only on the posterior angles. There is every gradation between the perfectly smooth and the completely rough forms. Roughness occurs quite sporadically in individuals, though more commonly in the female than the male, and in large examples rather than in small ones. It cannot therefore be used to characterise species or even local varieties. *A. trachyaspis* and *sculleyi* become merely synonyms of *numidicus* and *namaquensis* respectively (and *madagassicus* of *sakalavus*).

Very few examples (less than 1 per cent.) were found in which in rough specimens the asperities were so aggregated along the carina as to make the latter denticulate as in some forms of *cancriformis* (*mauritanicus*); and in these cases the amount of denticulation was dependent on the degree of roughness of the rest of the carapace.

3. The number of denticles on the posterior sinus or concave margin of the carapace is very variable: in *numidicus* from 34–55, in *namaquensis* from 46–54. It is an individual and not a specific character.

4. The flagella or endites of the 1st leg and the rami of the caudal furca are subject to a certain amount of variation in length, but mutilation during life occurs very frequently and renders these characters nugatory for taxonomic purposes. The endites and furcal rami on opposite sides often show disparity in length. The 4th endite is sometimes no longer than the 3rd. As a rule, however, the 4th endite is shorter than the carapace in *namaquensis*, as long as or a little longer than the carapace in *numidicus*; but it is not a clear-cut character.

The caudal rami are certainly relatively short in *namaquensis*, moderately long in *numidicus*, and very long in *cancriformis*. The specimens of *namaquensis* described by Sars had unusually short rami.

5. The number of segments exposed behind the carapace in dorsal view is a character so obviously dependent on the manner of preservation that it is remarkable that it should ever have been considered a specific character. Even in the same batch of specimens subjected to exactly the same treatment some specimens will be strongly contracted, while others will be in varying degrees of relaxation. In some cases where the preserving fluid has not been sufficiently strong to preserve the internal tissues properly, all the segments can be drawn out to nearly double their normal length by merely picking

the animal up by the end of its tail. This accounts for the length of the "tail" in Sars' figure of the ♂ *namaquensis*. The extent to which the spines on the segments overlap the following segment is also for the same reason not a taxonomic character. In the case of living animals, however, it is possible to distinguish in a general way a "short-tailed" species like *cancriformis* from a "long-tailed" species like *namaquensis*; or the "medium-tailed" species *numidicus* from both these.

6. The number of apodal segments, on the other hand, is a valuable taxonomic character. True, variation within certain limits is common, but when a sufficiently large number of specimens is examined an average can be struck which can be regarded as the normal number characteristic of the species. Individual specimens will, of course, crop up which, if judged by this character alone, will give trouble in identification.

In counting these segments the telson is always included. But the interpolation of an incomplete segment immediately preceding the telson occurs fairly often. This incomplete segment is visible on one or the other side, or only on the dorsal surface. It accounts for the number 18 given by Sars for the ♂ of *namaquensis*. In this work such incomplete segments are not counted.

From an examination of some 450 specimens of the oval-carapaced form *numidicus* it has been found that males with 12–15 segments, females with 9–13, occur. As the numbers 14 and 15 (♂), 12 and 13 (♀) occur also in the form *namaquensis*, single specimens were left out of account, only batches of specimens being considered. The numbers of segments occurred in the following percentages:—

♂.—12, 9 per cent.; 13, 30·5 per cent.; 14, 30·5 per cent.; 15, 24 per cent.

♀.—9, 18 per cent.; 10, 30·5 per cent.; 11, 25 per cent.; 12, 18 per cent.; 13, 8·5 per cent.

Thus the normal number of segments in this species appears to be 13–14 in the male, 10 in the female; and the most frequent variation in both sexes is the addition of 1 segment. It will be noticed that *somalicus* Wed. and *zanoni* Col. fall within these limits, and should probably be reckoned synonymous with *numidicus*.

In a much smaller series of the round-carapaced form *namaquensis* the following percentages were found:—

♂.—14, 34 per cent.; 15, 42 per cent.; 16, 13·5 per cent.; 17, 10·5 per cent.

♀.—12, 28·5 per cent.; 13, 50 per cent.; 14, 21·5 per cent.

The normal number is thus 15 in the male, 13 in the female, and the most frequent variation is the omission of 1 segment.

The variation of $+1$ in *numidicus* and -1 in *namaquensis* might seem to imply that there is really only the one species. A combination of the two series results in the normal number of segments being 14–15 in the male. But one has to take into account the shape of the carapace, which, as already remarked, shows no transition between the definitely oval and the definitely round contours. Thus *namaquensis* appears to be a definable and valid species.

It is to be regretted, however, that an equally long series was not

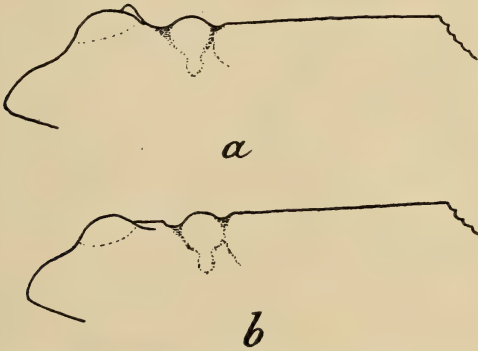


FIG. 23.—Profile of carapace to show shape of nuchal organ in : *a*, *Apus sudanicus* and *cancriformis*, and *Lepidurus viridis* ; *b*, *Apus numidicus* and *namaquensis*, and *Lepidurus arcticus*.

available of *namaquensis*, or of *sudanicus* and *cancriformis*, as of *numidicus*.

7. The nuchal organ, or postocular tubercle (Sars), or cervical gland (Bernard). In dorsal view this organ shows as a whitish pellucid spot which may be triangular, subcircular, or oval in shape ; the triangular shape is sometimes somewhat ovoid or trapezoidal. How far slight variations in form or size, as seen in preserved specimens, may be due to the method of preservation has not been determined. Nor does it matter much, because the essential difference lies not in the shape of the pellucid area so much as in the shape and position of the *raised* area as seen in profile. When the organ is triangular it forms a flattened depressed tubercle situated mostly behind the level of the hind margin of the eyes ; when oval it forms a bluntly conical tubercle situated between the hinder portions of the eyes and as high as, or even a little higher than, the eyes. In profile the shape and position are very distinctive (text-fig. 23).

The depressed, triangular form is found in *A. numidicus*, *namaquensis*, *sakalavus* (Nobili's description is quite clear on this point),* and in *Lepidurus arcticus* (from Norway). *A. zanoni* also has a triangular organ, but whether it is also depressed is not stated.

The oval, conical type is found in *A. cancriformis* and *sudanicus*, and in *Lepidurus viridis* (from Australasia).

Ghigi has used the shape of the pellucid area as seen in dorsal view as one of the characters of his genus *Proterothriops*. Gurney (1924, p. 565) doubts the validity of it as a generic distinction. From the fact that the same difference occurs in *Lepidurus* as well as in *Apus*, I am inclined to agree with Gurney that it is not of generic importance, though it is valuable as a specific character.

8. The presence or absence of spines on the dorsal and ventral surfaces of the telsonic segment is neither constant nor correlated with other characters, and cannot be used as a specific character. Specimens in which the ventral surface is quite or almost smooth occur in the same batches with others in which it is more or less spinose or even strongly spinose. Spines are usually more strongly developed in males than in females.

Thus the characters most useful for taxonomic purposes appear to be: the shape of the nuchal organ and the average number of apodal segments, the shape of the carapace, and, to a lesser extent, the length of the 4th endite of the 1st leg.

Using these characters a very considerable reduction in the number of species is possible; e.g. taking only the African fauna, from about 17 species to 5, or perhaps only 4. As a purely tentative suggestion the following synopsis is given.

I. Nuchal organ depressed, triangular.

A. Apodal segments ♂ 12-15, ♀ 9-13 (average ♂ 13-14, ♀ 10). 4th endite of 1st leg about as long as carapace.

1. *numidicus* Gr. (syn.: *dispar*, *trachyaspis*, *somalicus*, *zanoni*, and *dukianus*).

2. *sakalavus* Nob. (syn.: *madagassicus*).

B. Apodal segments ♂ 14-17, ♀ 12-14 (average ♂ 15, ♀ 13). 4th endite of 1st leg rather shorter than carapace.

3. *namaquensis* Richt. (syn.: *sculleyi*).

* "Semiovato-subtriangolare, depresso-subescavato." Nobili says further there is a small granule in the centre, evidently similar to that mentioned and figured by Sars (1898) in *numidicus*. I have not seen a trace of this "small circular knob" in any specimen, not even in some of the original specimens raised by Sars from dried mud and sent to this Museum.

II. Nuchal organ conical, oval.

A. Apodal segments ♂ 9-13, ♀ 7-8.

4. *sudanicus* Br. (syn.: *numidicus* Bouv. non Gr., *abyssinicus*, *uebensis*).

B. Apodal segments ♂ 6-8, ♀ 5-7.

5. *cancriformis* Sch. (syn.: *simplex*, *mauritanicus*, *ovamboensis*, and *apulius*).

A. sakalavus should probably be united with *numidicus*. *A. bottegoi* Prato may be either *sudanicus* or *cancriformis*; it has 7 apodal segments, but the sex is not stated. I have not seen Prato's paper and do not know whether the nuchal organ was described, and, if so, what was its shape.

Sexual Characters.—In addition to the egg-capsule on the 11th pair of legs, and the greater number of apodal segments in the male, there seem to be only two other secondary sexual characters.

The differences in the 2nd-5th pairs of legs seem to have been somewhat overrated (Sars, 1898; Thiele, 1907; Ghigi, 1921). These legs are certainly stronger and more robust in the male, as Sars says, but in the South African material I have failed to find any other constant or noteworthy differences in the appendages of the two sexes.

Gurney (1924) has well illustrated the difference in armature of the caudal furca in *numidicus*. Packard (1883) noticed this difference in some of the North American species, and Thiele (1907) briefly referred to a similar difference in *madagassicus*, which is the male of *sakalavus*. In *numidicus* and *namaquensis* the rami of the furca in the male are broader and more tumid at the base than in the female; they often diminish rather suddenly in diameter (at about the point where they are cut off in Gurney's figures), whereas in the female they taper off gradually and evenly.

The spines on the segments, especially on the ventral surface, are much stronger and more numerous in the male than in the female, often partaking of the same blunt or scale-like shape of those found on the base of the caudal furca.

Other characters, such as the number of joints in the endites of the 1st pair of legs (Ghigi, 1921), the denticles on the posterior sinus of the carapace (Ghigi, 1921), or the shape and roughness of the carapace (Thiele, 1907), are not constant sexual characters.

The differences in the shape of the caudal rami and the armature of the rami and the segments is not marked in *sudanicus* or *cancriformis*. Further research might show that these features are possibly correlated with the shape of the nuchal organ, in which case there might be some reason for separating a "Proterothriops" group of species within the genus *Apus*.

Key to the South African species.

1. Nuchal organ depressed, triangular.
 - a. Carapace oval. Apodal segments (average) ♂ 13-14, ♀ 10 . *numidicus*.
 - b. Carapace round. Apodal segments (average) ♂ 15, ♀ 13 . *namaquensis*.
2. Nuchal organ conical, oval.
 - a. Apodal segments ♂ 11, ♀ 8-10 (usually 9) . . . *sudanicus*.
 - b. Apodal segments ♂ 6-8, ♀ 5-7 . . . *cancriformis*.

Apus numidicus Grube.

(Text-fig. 25, b.)

1865. *Apus numidicus*. Grube, Arch. Naturg., xxxi, p. 278, pl. xi, figs. 14, a, b.
1877. „ *dispar*. Brauer, SB. K. Ak. Wiss. Wien, lxxv, p. 589, pl. i.
1880. „ *dukianus*. Day, Proc. Zool. Soc. Lond., p. 392, text-fig.
1893. „ *numidicus*, var. *strauchii*. Braem, Zeitsch. wiss. Zool., lvi.
1898. „ „ Sars, Arch. Naturv. Krist., xx, 4, p. 5, pl. i.
1899. „ „ *Id., ibid.*, xxi, 4, p. 6.
1899. „ *trachyaspis*. *Id., ibid.*, xxi, 4, p. 15, pl. ii, figs. 1, 2.
1905. „ *numidicus*. *Id., ibid.*, xxvii, 4, p. 3.
1910. „ „ Stebbing, Ann. S. Afr. Mus., vi, p. 484.
1910. „ *trachyaspis*. *Id., ibid.*, p. 485.
1924. „ *numidicus*. Barnard, *ibid.*, xx, p. 214 (part).
1924. „ „ Gurney, Ann. Mag. Nat. Hist., (9), xiv, p. 559, figs. 1, 2.

Probable further synonyms are :

1895. *Apus somalicus*. Wedenissow, Bull. Soc. ent. Ital., xxvi.
1899. „ „ Pavesi in Robecchi Bricchetti "Somali e Benadir," pp. 699, 700.
1920. „ *zanoni*. Colosi, Monit. Zool. Ital., xxxi, p. 120.
1921. *Proterothriops zanoni*. Ghigi, Att. Soc. Ital. Sci. Nat., lx, p. 167, fig. 3.
1922. *Apus zanoni*. Colosi, *ibid.*, lxi, p. 293.
1923. „ *somaticus*. *Id., ibid.*, lxii, p. 81.

Nuchal organ depressed, triangular or subtriangular or trapezoidal.
Carapace oval, its length (*i.e.* including the posterior angles) a little

Bechuanaland : Asbestos Mts. (J. H. Power).

Orange Free State : Bethlehem (Durban Mus.) ; Bloemfontein and Ladybrand (Albany Mus.).

Transvaal : Witbank ; Rietfontein ; Heidelberg.

Great Namaqualand : Great Fish River near Gibeon.

Damaraland : Gobabis (Kimberley Mus.).

Ovamboland : Ondongua ; Onolongo ; Uwuthija.*

Kaokoveld : Kamanyab ; Choabendus.

Distribution.—Northern Africa, Arabia, Afghanistan.

Type of *trachyaspis* in South African Museum.

This is by far the commonest and most widely distributed species in South Africa. The smallest ovigerous ♀ I have seen was 9 mm. in median length of carapace.

Bouvier (1899, Ann. Mus. Civ. Genova, ser. 2, vol. xix, p. 576) wrongly states that this species has 8–9 apodal segments.

Apus namaquensis Richt.

(Text-fig. 25, a.)

1886. *Apus namaquensis*. Richters, Ber. Senckenb. Ges., p. 31.

1899. „ „ Sars, Arch. Naturv. Krist., xxi, 4, p. 6,
pl. i, figs. 1–8 (as a n.sp.).

1899. „ *sculleyi*. *Id.*, *ibid.*, p. 12, pl. i, figs. 9–13.

1907. „ *elongatus*. Thiele, SB. Ges. naturf. Fr. Berlin, 1907,
No. 9, p. 290 (nom. nov. for *namaquensis* Sars).

1910. „ *namaquensis*. Stebbing, Ann. S. Afr. Mus., vi,
p. 485.

1910. „ *sculleyi*. *Id.*, *ibid.*, p. 485.

1913. „ „ Daday, Voy. Afr. Orient. Alluaud. Phyllop,
p. 9.

1924. „ *namaquensis*. Barnard, Ann. S. Afr. Mus., xx,
p. 214.

Nuchal organ depressed, triangular. Carapace circular, only very slightly, if at all, longer than broad, flattened, lateral margins usually slightly concave near the posterior angles. Number of apodal segments normally 15 in ♂, 13 in ♀, varying from 14–17 in ♂, 12–14 in ♀. Denticles on posterior sinus 46–54. Fourth endite of 1st leg usually

* The specimens recorded by me in 1924 from Kalkfontein South and Ongka prove, on closer examination, to belong to *sudanicus*.

a little shorter than carapace. Caudal rami in ♀ usually not longer than median length of carapace, in ♂ often considerably shorter.

Length.—Carapace (median length) up to 20 mm. (♂ and ♀).

Colour.—Horn or amber colour, often more or less olivaceous, eyes dark, ova pinkish or dark red.

Locality.—Cape Province : Bushmanland (=Little Namaqualand) (Sars) ; Aries, Narugas, Langklip (these three localities in the Gordonia District) ; Upington ; Kimberley.

Great Namaqualand : Angra Pequena (=Lüderitzbucht) (Richters) ; Kalkfontein South.

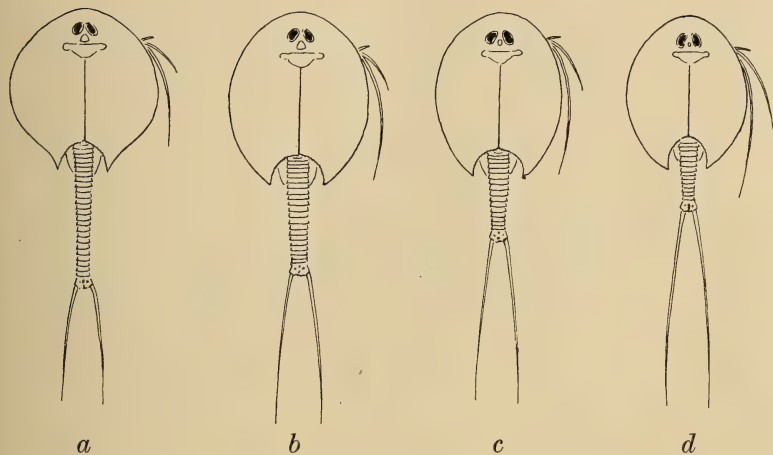


FIG. 25.—Semidiagrammatic figures of the four South African species of *Apus* : *a*, *namaquensis* ; *b*, *numidicus* ; *c*, *sudanicus* ; *d*, *cancriformis*.

Distribution.—Kinangop in British East Africa (Daday).

Types of *namaquensis* Sars and *sculleyi* in South African Museum.

In view of the limited and compact distribution of this species in South Africa, its discovery in British East Africa is interesting. Unfortunately Daday, though he had a large number of both sexes, merely gave measurements and no indication of, *e.g.*, the variation in the number of apodal segments. A re-examination of these specimens is desirable.

The largest specimens I have seen came from Upington in the Gordonia District. In three localities in the same district I have collected very small examples, including an ovigerous ♀ only 5 mm., and the largest ♂ only 9 mm. ; in all these specimens the nuchal organ is relatively very large and distinctly trapezoidal in shape.

It is impossible to say whether the small size of the animals and the large size of the nuchal organ is in any way due to a slight brackishness in the water.

The number 18, given by Sars for the apodal segments in the ♂, is due to an aberration in one of the types; the segment before the telson being an incomplete one visible only on the dorsal surface. Sars' figure 5 is incorrect, though figure 4 of the dorsal surface is correct. The other type ♂ has 17 complete segments.

The remarkable shortness of the caudal furca as described by Sars in the ♂ is unusual, but the rami are characteristically shorter in this species than in the others, especially so in the male.

This species was named after Mr. W. C. Scully, formerly Resident Magistrate in Namaqualand, but the name was incorrectly spelt by Sars.

Apus sudanicus Br.

(Text-fig. 25, c.)

1877. *Apus sudanicus*. Brauer, SB. Ak. Wiss. Wien, lxxv, p. 590.
 1886. „ *abyssinicus*. Richters, Ber. Senckenb. Ges., p. 32.
 1893. „ *sudanicus* var. *chinensis*. Braem, Zeitsch. wiss. Zool., lvi, p. 180.
 1924. „ *numidicus*. Barnard, Ann. S. Afr. Mus., xx, p. 214 (part).

Probable further synonym :

1922. *Thriops uebensis*. Colosi, Att. Soc. Ital. Sci. Nat., lxi, p. 296.

Nuchal organ conical, oval. Carapace oval, slightly longer than broad, more or less arched, lateral margins not concave near posterior angles. Number of apodal segments in ♂ 11, in ♀ 8-10 (usually 9 in ♀). Number of denticles on posterior sinus 44-56. Fourth endite of 1st leg about as long as carapace. Caudal rami about as long as carapace including posterior angles.

Length.—Carapace (median length) up to 22 mm. (♀).

Colour.—Horn or amber colour, more or less olivaceous, eyes dark, eggs reddish.

Locality.—Cape Province : Kimberley ; Upington ; Moloppo River 45 miles N. of Upington.

Great Namaqualand : Kalkfontein South ; Keetmanshoop.

Ovamboland : Ongka (N. of Ondongua).

Distribution.—Khartoum, Ailar, and N. of Cairo. (China ?)

The South African specimens are assigned to this species on account of the agreement in the number of apodal segments. I have not seen any authentic specimens.

Apus cancriformis Sch.

(Text-fig. 25, *d.*)

1756. *Apus cancriformis*. Schaeffer, Monogr. d. krebsart. Kieferf.
 1877. „ „ Brauer, SB. Ak. Wiss. Wien, lxxv,
 p. 592.
 1886. „ „ Simon, Ann. Soc. ent. Fr., ser. 6, vol. vi,
 p. 425.
 1893. „ „ Braem, Zeitsch. wiss. Zoll., lvi, p. 183.
 1909. *Triops* „ Keilhack, Susswasserfauna Deutschl.,
 Hft. 10, Phyllop.
 1911. *Apus* „ Kemp, Rec. Ind. Mus., vi, p. 353.
 1921. *Thriops* „ Ghigi, Att. Soc. Ital. Sci. Nat., lx, p. 170.
 1921. „ *mauritanicus*. *Id.*, *ibid.*, p. 175, fig. 9.
 1921. „ *apulius*. *Id.*, *ibid.*, p. 176, fig. 10.
 1921. „ *simplex*. *Id.*, *ibid.*, p. 177.
 1923. *Apus cancriformis*. Gurney, Ann. Mag. Nat. Hist., (9), xi,
 p. 496.
 1923. *Thriops* „ Colosi, Att. Soc. Ital. Sci. Nat., lxii, p. 75.
 1924. „ „ Ghigi, *ibid.*, lxiii, p. 193.
 1924. *Apus ovamboensis*. Barnard, Ann. S. Afr. Mus., xx, p. 215.

Nuchal organ conical, oval. Carapace oval, slightly longer than broad, more or less arched, lateral margins not concave near posterior angles. Number of apodal segments in ♂ 6–8, in ♀ 5–7 (usually 7 in ♂, 6 in ♀). Number of denticles on posterior sinus 32–36. Fourth endite of 1st leg longer than carapace. Caudal rami as long as, or even longer than, the rest of the animal.

Length.—Carapace (median length) up to 17 mm. (♀).

Colour.—Horn or amber colour, more or less olivaceous, eyes dark, eggs salmon or reddish.

Locality.—Ovamboland : several localities.

Distribution.—Europe, Northern Africa, Kashmir.

Type of *ovamboensis* in South African Museum.

This species is characterised by its short “tail” with the very long filaments. Further study has convinced me that *ovamboensis* is merely a synonym of *cancriformis*.

ORDER 3. CONCHOSTRACA.

1867. *Conchostraca*. Sars, Crust. d'eau douce Norv., pp. 5, 6.
 1902. *Conchophylla*. Stebbing, Encycl. Brit., ed. 10, vol. xxviii
 (Suppl., vol. iv), p. 269.
 1913. *Conchostraca*. Daday, Math. Term. Ert., xxxi, p. 561
 (classification in Hungarian).
 1915. „ *Id.*, Ann. Sci. Nat., ser. 9, vol. xx, p. 39.
 1923. „ *Id.*, *ibid.*, ser. 10, vol. vi, p. 255.
 1925. „ *Id.*, *ibid.*, ser. 10, vol. viii, p. 143.

Body short, enclosed within a bivalve shell, ending posteriorly in a claw-like caudal furca (except *Lynceidae*). Front of head produced downwards, forming a frontal process or rostrum. Paired compound eyes sessile, more or less confluent; ocellus placed below the compound eyes. First antennae short or long, unjointed, 2-jointed, or many-jointed. Second antennae natatory, biramous. Trunk-limbs (legs) 10-27 pairs, of which 0-16 are post-genital. Rami of caudal furca short, claw-like. Genital ducts opening on 11th segment. Ova retained within the shell attached to the 9th-15th pairs of legs. Young hatched in the Nauplius stage, or (*Cyclestheria*) the development takes place within the shell of the mother.

Distribution world-wide.

For fossil representatives of this order see under the family *Cyzicidae*.

Key to the South African families.

- I. Shell very tumid, without growth-lines. Head very large. Caudal furca absent *Lynceidae*.
 II. Shell laterally compressed.
 A. Shell with few and indistinct growth-lines.
 1. Shell circular in side view *Cyclestheriidae*.
 2. Shell ovate in side view *Limnadiidae*.
 B. Shell with numerous and distinct growth-lines.
 1. Rostrum (in adult) unarmed (or with a minute spine in ♀) *Cyzicidae*.
 2. Rostrum armed with a distinct apical spine in both sexes *Leptestheriidae*.

FAM. LYNCEIDAE.

1896. *Limnetidae*. Sars, Fauna Norveg., 1 Phylloc. og Phyllop, p. 116.
 1902. *Lynceidae*. Stebbing, Zoologist, p. 101.
 1902. „ *Id.*, *loc. cit.*, p. 270.

1910. *Lynceidae*. *Id.*, Ann. S. Afr. Mus., vi, p. 486.

1913. „ Daday, Math. Term. Ert., xxxi, pp. 566, 588.

Shell very tumid, subglobular, without growth-lines, hinge rather long. Head large, without frontal appendage, with distinct fornix on each side extending to end of rostrum. Rostrum spatulate, unarmed, more or less differing in shape in the two sexes. Eyes contiguous in front. First antenna short, 2-jointed, clavate, apex with sensory setae. Second antenna moderate. Ten (♂), 12 (♀) pairs of legs; 1st pair (rarely also one of the 2nd pair) in ♂ prehensile; 9th and 10th pairs in ♀ ovigerous. Caudal furca absent. Telson covered below by a laminate operculum. A lobed lamellate process on each side in ♀ arising from the last 2 segments, apparently for the purpose of supporting the egg-masses.

World-wide, in fresh-water.

The members of this family are easily recognised by the tumid shell and large head.

Gen. LYNCEUS O. F. Müll.

1776. *Lynceus* (part). O. F. Müller, Zool. Dan. Prodr., pp. xxvii, 199.

1816. „ Leach, Encycl. Brit., ed. 5, p. 406.

1847. *Limnetis*. Loven, K. Vet. Ak. Handl., lxvi (for 1845), p. 430.

1848. *Hedessa*. Lieven, Schr. naturf. Ges. Dantzig, iv, Hft. 2, p. 4.

1853. *Limnetis*. Grube, Arch. Naturg., xix, p. 71.

1883. „ Packard, U.S. Geol. Geogr. Surv. Territ., xii, p. 298.

1907. *Lynceus*. Thiele, SB. Ges. naturf. Fr. Berlin, 1907, p. 294.

1910. „ Stebbing, *loc. cit.*, p. 486.

1913. „ Daday, Math. Term. Ert., xxxi, p. 589 (key to species in Hungarian).

1926. *Limnetis*. Gurney, Intern. Rev. Hydrob., xvi, p. 114 (figs. of *Nauplius* larva).

Only the 1st pair of legs in the ♂ prehensile.

In the only other genus, *Lynceopsis* Daday, one of the 2nd pair of legs, either the right or the left, is also prehensile.

In his 1913 paper (of which I have seen a translation) Daday subdivides the genus into *Lynceus sensu stricto* and *Eulynceus* n. subg. In the former the prehensile legs of the ♂ are similar on the two sides and the terminal claw or finger is usually narrow and scythe-shaped; in the latter the legs on the two sides differ in shape and the terminal claw is usually stout.

All the South African species belong to *Lynceus* s. str. I have not been able to refer them to any of the species mentioned in Daday's key. It is greatly to be regretted that Daday did not live to publish a revision of this family with detailed descriptions and figures as he did for most of the other families of *Conchostraca*.

Four South African species are here listed, though it has not been possible to identify with certainty Loven's species *wahlbergi*. Of the two Ovamboland species several additional characters are noted which were omitted in the preliminary diagnosis. A further new species is described from Bechuanaland.

Of the two Madagascan species—*rotundus* Thiele, 1907, and *madagascarensis* Thiele, 1907—we have detailed accounts and figures of the prehensile legs of the ♂, but no figures of the rostra. Both these species require redescribing and figuring.

Key to the South African species.

1. Rostral keel double in both sexes.
 - a. Fornix running to end of rostrum, i.e. rostrum spatulate, in both sexes
bicarinatus.
 - b. Fornix running to end of rostrum in ♀, but to middle of lower margin in ♂, i.e. rostrum spatulate in ♀, truncate in ♂ . . . *pachydactylus*.
2. Rostral keel single in both sexes. Rostrum truncate in both sexes.
 - a. Granules on proximal joint of 1st leg ♂ *truncatus*.
 - b. No granules on proximal joint of 1st leg ♂ *lobatsianus*.

Lynceus bicarinatus Brnrd.

(Text-fig. 26, h.)

1924. *Lynceus bicarinatus*. Barnard, Ann. S. Afr. Mus., xx, p. 224, pl. xxvi, figs. 12–15.

Shell subcircular, slightly deeper anteriorly. Profile of head above eyes nearly straight. Rostrum with double median keel in both sexes, fornix running to apex of rostrum and ending in a small projection, apex spatulate, truncate, rather more convex in ♀ than ♂, margin in both sexes crenulate. Opercular plate below telson with margin excised. Prehensile leg in ♂ with distal joint trapezoidal, the "palm" distinct from rest of margin, the longer of the 2 terminal appendages tapering distally, margin facing exopod with about 6–8 stout tubercles, finger moderately slender and curved, not exceeding palm; proximal joint with very short and unornamented margin facing the very stout exopod. Posterior lamella of ♀ with 3 marginal

processes and 1 accessory process on dorsal surface near junction with body.

Diameter.—Up to 8 mm.

Colour.—Horny with a slight greenish tinge.

Locality.—Ovamboland : several localities.

Type in South African Museum.

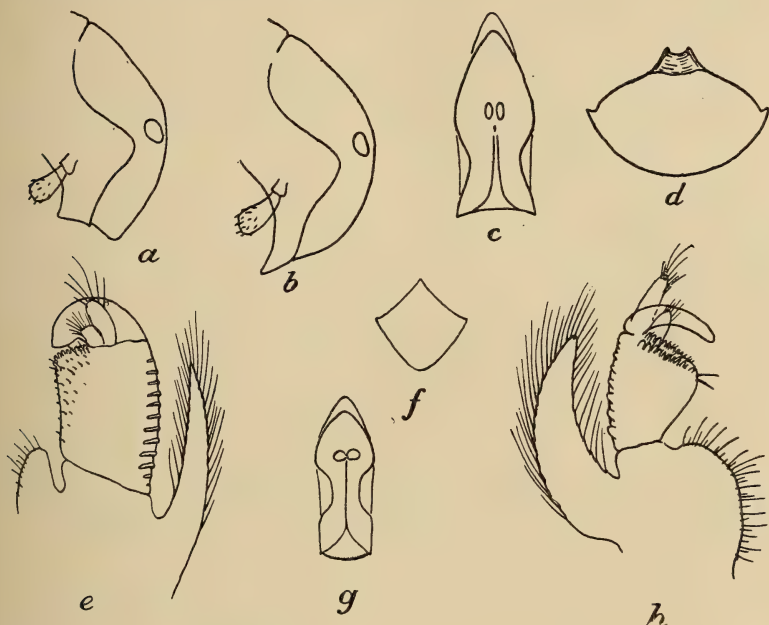


FIG. 26.—*Lynceus pachydactylus* n. sp.: *a*, Profile of head ♂; *b*, profile of head ♀; *c*, frontal view of head ♂; *d*, ventral view of rostrum ♂; *e*, prehensile leg of ♂. *L. lobatsianus* n. sp.: *f*, Ventral view of rostrum ♂; *g*, frontal view of head ♀. *L. bicarinatus* Brnrd.: *h*, Prehensile leg of ♂.

Lynceus pachydactylus n. sp.

(Text-fig. 26, *a-e*.)

Shell subcircular, slightly deeper anteriorly. Profile of head above eyes nearly straight. Rostrum with double median keel in both sexes, truncate in ♂, spatulate in ♀, fornix running to middle of lower margin in ♂, to apex in ♀, lower hind margin crenulate in ♀; the truncate lower end of rostrum in ♂ oval, hind margin evenly convex, not crenulate, the ends of the fornices forming small points. Opercular plate below telson bilobate in both sexes, larger in ♂ than ♀.

Prehensile leg in ♂ with distal joint oblong, "palm" short but distinct, with about 10 stout blunt spines, margin facing exopod with 10-12 transverse ridges, finger very stout, short, nearly semicircular in outline, the longer of the two terminal appendages scarcely projecting beyond margin of finger; proximal joint with very short and unornamented margin facing exopod. Posterior lamella in ♀ with 3 marginal processes.

Diameter.—Up to 5 mm.

Colour.—Horny, eggs yellowish or salmon.

Locality.—Transvaal: Rietfontein (between Pretoria and Johannesburg); Heidelberg.

Type in South African Museum.

This species resembles *madagascarensis* Thiele and *massaicus* Thiele in the short thick finger of the prehensile leg of ♂, but the shape of the "hand" is different. In other respects also it is close to *massaicus*, as, e.g., in the short terminal appendages of the "hand" of the ♂ and the posterior lamella in the ♀. The shape of the rostrum in both sexes appears to be very similar in these two species. Thiele's figure (1900, Zool. Jahrb. Syst., xiii, pl. xxxviii, fig. 31) of the ♂ does not quite correspond with his text, and gives the impression that it is not a full lateral view, but has the lower end of the rostrum tilted up and the continuation of the line representing the lower margin omitted. If this were so, the fornix would run to the middle of the lower margin as in *pachydactylus*. The two species, however, are easily separated by the prehensile legs of the ♂.

Lynceus truncatus Brnrd.

(Text-fig. 27.)

1924. *Lynceus truncatus*. Barnard, Ann. S. Afr. Mus., xx, p. 224, pl. xxvi, figs. 5-11.

Shell subcircular, slightly deeper anteriorly. Profile above eyes straight or slightly concave. Rostrum with a single median keel in both sexes, distally truncate, fornix running to about middle of lower margin (viewed laterally) and ending in small spiniform projections; in ♂ lower end of rostrum appears diamond-shaped, the median keel forming an acute projection in front, the posterior end also forming a sharp angle; in ♀ the lower hind end of rostrum is shovel-like, with the margin finely denticulate. Opercular plate below telson much reduced in ♀, much broader than long, margin convex; in ♂ obsolete. Prehensile leg of ♂ with the distal joint

oblong, longer than broad, the curved rather slender finger closing between two rows of stout spines and spine-setae, the longer of the two terminal appendages somewhat club-shaped at apex, proximal joint with the long margin facing the slender exopod set with numerous transverse rows of minute granules. Posterior lamella of ♀ with 3

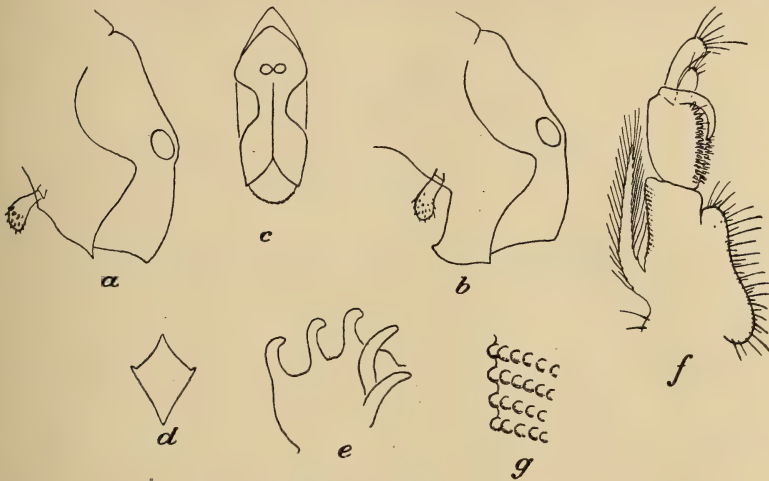


FIG. 27.—*Lynceus truncatus* Brnrd. a, Profile of head ♂; b, profile of head ♀; c, frontal view of head ♀; d, ventral view of rostrum ♂; e, left posterior lamella ♀, dorsal view, anterior end to right; f, prehensile leg ♂; g, granules on proximal joint of latter further enlarged.

marginal processes curving downwards and 2 (sometimes 3) accessory processes on dorsal surface.

Diameter.—3 mm.

Colour.—Horny.

Locality.—Ovamboland : Ukualuthi.

Type in South African Museum.

Lynceus lobatsianus n. sp.

(Text-fig. 26, f, g.)

Very similar to *truncatus*. Truncate apex of rostrum in ♂ in ventral view less elongate, diamond-shaped, the median keel and fornicies less prominent, and the hinder angle more rounded. Lower hind end of rostrum in ♀ less produced. Opercular plate not reduced in ♀ or absent in ♂, margin convex. Proximal joint of prehensile leg of ♂ without rows of granules on margin facing exopod.

Diameter.—2.5–3 mm.

Colour.—Horny.

Locality.—Bechuanaland : Lobatsi (J. H. Power).

Type in Kimberley Museum, cotype in South African Museum.

This form may prove to be a variety only of *truncatus*, but in the absence of intermediates the two forms are very distinct.

Species insufficienter descripta.

Lynceus wahlbergi (Loven).

1847. *Limnetis wahlbergi*. Loven, *loc. cit.*, p. 430, pl. iv.

1904. „ „ Gurney, *Proc. Zool. Soc. Lond.*, ii, p. 299.

♀.—Shell subcircular, deeper anteriorly. Profile of head straight above eyes, strongly and evenly convex below. Rostrum with a double median keel, fornix running to apex of rostrum.

Diameter.—3 mm.

Locality.—“ In paludibus terrae Caffrorum Natalensium ” (Loven).*

Orange Free State : Kroonstad (Gurney).

Type in Stockholm Museum.

Loven (and Gurney) had only female specimens, consequently there remains a doubt as to the exact identity of this form. One or the other of the bicarinate species, *bicarinatus* or *pachydactylus*, is probably really the same as Loven's species, but as the doubt will always remain it is better to take no account of the name *wahlbergi*.

Thiele (1900, *Zool. Jahrb. Abt. Syst.*, xiii, p. 572, pl. xxxviii, figs. 26–38) identified a ♂ and ♀ from Massai Nyika (Tanganyika) as this species, but later (1907, *SB. Ges. naturf. Fr. Berlin*, p. 294, footnote) regarded them as distinct under the name *massaicus*. The ♀, and it seems the ♂ also, has a double rostral keel, thus resembling *jeanneli* and *bicarinatus*; the prehensile leg of the ♂, however, is very distinct.

FAM. CYCLESTHERIIDAE.

1888. *Limnadiidae* (part). Sars, *Vid. Selsk. Skr. Forh. Krist.* for 1887, i.

1913. *Cyclestheriidae*. Daday, *Math. Termt. Ert.*, xxxi, pp. 566, 588.

Shell thin, pellucid, laterally compressed, subcircular in outline, with few and inconspicuous growth-lines, hinge short. Head without

* See note on locality under *Streptocephalus cafer*.

frontal appendage, with rudimentary fornices. Rostrum compressed, securiform, apically serrate. Eyes fused into one. First antenna rather long, simple, unjointed. Second antenna strong. Sixteen pairs of legs, 1st in ♂ prehensile. Caudal furca claw-like.

The development takes place within the shell of the mother without any free-swimming stage.

Only one genus.

Gen. CYCLESTHERIA Sars.

1888. *Cyclestheria*. Sars, *loc. cit.*, pp. 5, 6.

1913. „ Daday, *loc. cit.*, p. 588.

With the characters given above.

Widely distributed in tropical and subtropical regions.

Cyclestheria hislopi (Baird).

(Text-fig. 28.)

1859. *Estheria hislopi*. Baird, Proc. Zool. Soc. Lond., p. 232,
pl. lxiii, figs. 1, 1b.

1886. *Limnadia* „ Brady, J. Linn. Soc., xix, p. 294, pl. xxxvii,
figs. 1-3.

1888. *Cyclestheria* „ Sars, *loc. cit.*, p. 8, pls. i-viii.

1898. „ „ Weltner, SB. Ges. naturf. Fr. Berlin,
p. 199.

1900. „ „ Thiele, Zool. Jahrb. Abt. Syst., xiii, pp.
564, 576.

1903. „ „ Sayce, Tr. Roy. Soc. Vict., xv, 2, p. 256,
pl. xxxvi, fig. c.

1913. „ „ Daday, Voy. Alluaud. Afr. orient. Crust.,
p. 3.

1913. *Eulimnadia victoriae*. Brady, Ann. Natal Mus., ii, p. 469,
pl. xxxvii, figs. 1-7.

1924. *Cyclestheria hislopi*. Barnard, Ann. S. Afr. Mus., xx, p. 223.

Up to the present only one species has been recognised, though Thiele (*loc. cit.*, p. 576) regards the Brazilian form as specifically distinct. It is easily recognised by the family diagnosis and the figures here given.

Diameter.—4-5 mm.

Colour.—Horny with a slight greenish tinge.

Locality.—Rhodesia : Victoria Falls (Brady).

Ovamboland : several localities (Barnard).

Portuguese East Africa : Quilimane (Thiele).

Distribution.—India (Baird), Ceylon (Brady), Queensland, Celebes, East Africa, Brazil (Sars), British East Africa (Daday).

Type (of *hislopi*) in British Museum, of *victoriae* ? lost.

It seems a little remarkable that Brady, in describing this form as a new species in 1913, did not recognise it as the same as that which he had examined and figured in 1886 from Ceylon. He does not

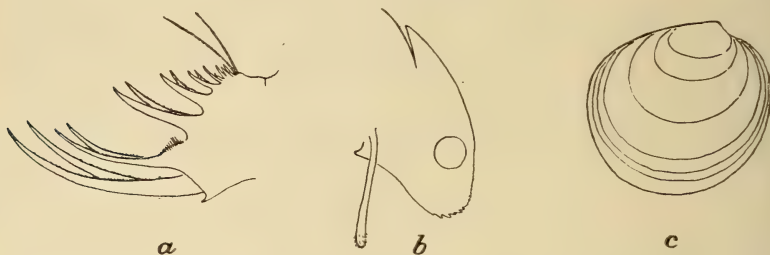


FIG. 28.—*Cyclestheria hislopi* (Baird). *a*, Telson and caudal furca ; *b*, head ; *c*, lateral view of shell.

state that the Victoria Falls specimen actually had 18 pairs of legs, though he mentions that *Eulimnadia* is distinguished from *Limnadia* by that number. According to Daday's more recent work this generic distinction does not hold good.

FAM. LIMNADIIDAE.

1896. *Limnadiidae* (part). Sars, Fauna Norv., i, p. 84.

1913. „ Daday, Math. Termt. Ert., xxxi, pp. 566, 584.

1925. „ Id., Ann. Sci. Nat., ser. 10, vol. viii, p. 143.

Shell thin, pellucid, laterally compressed, ovate in outline, with few and inconspicuous growth-lines, often slightly dimorphic in the two sexes, hinge rather long. Head with frontal appendage (in adult), without fornices. Rostrum compressed, apex unarmed. Eyes contiguous. First antenna moderately long, anterior margin with short rounded lobes bearing sensory setae. Second antenna rather strong. Eighteen to thirty-two pairs of legs ; 1st and 2nd pairs in ♂ prehensile ; 9th and 10th, and sometimes also 11th, pairs in ♀ each with a long filamentous appendage (exopod) to which the egg-mass is attached. Caudal furca claw-like.

Daday (1925) recognised three genera: *Limnadia*, *Eulimnadia*, and *Limnadopsis*. *Paralimnadia* Sars is regarded as a synonym of *Limnadia*, though the shell with its numerous growth-lines might be considered a good generic character. *Limnadopsis* has a serrate hinge-line and more numerous legs.

Eulimnadia was defined by Packard as having only 18 pairs of legs, but Daday does not adopt this as a distinguishing feature. It has also been considered distinct from *Limnadia* on account of its being bisexual; up to the present no males have been seen of the typical species of *Limnadia* (*L. lenticularis*). As this argument might any day be put out of court by the discovery of males of one of the species of *Limnadia*, I agree with Daday that structural characters alone should be the criterion for separating these two genera, if indeed it be deemed worth while to separate them at all. Daday relies upon the presence (*Eulimnadia*) or absence (*Limnadia*) of an acute projection on the lower distal angle of telson as a distinguishing feature. If this is the only feasible character, the separation of the two genera seems insecure, and Daday himself felt (*loc. cit.*, p. 147) that later authors might regard both genera, and even *Limnadopsis*, as subgenera only of *Limnadia*.

Gen. EULIMNADIA Pack. Dad.

- 1874. *Eulimnadia*. Packard, 6th Rep. Peabody Ac. Sc., p. 55.
- 1874. „ *Id.*, Hayden's U.S. Geol. Geogr. Surv. Rep.
for 1873, p. 618.
- 1883. „ *Id.*, U.S. Geol. Geogr. Surv. Territ., xii,
pt. 1, p. 311.
- 1895. „ Ishikawa, Zool. Mag. Tokio, vii, No. 76.
- 1896. „ Sars, Arch. Naturv. Krist., xviii, No. 8.
- 1902. „ *Id.*, *ibid.*, xxiv, No. 6.
- 1911. „ Wolf, Fauna S.W. Austral., iii, p. 270.
- 1913. „ Daday, Math. Term. Ert., xxxi, pp. 584, 585
(key to species) (in Hungarian).
- 1914. „ Dakin, Proc. Zool. Soc. Lond., p. 298.
- 1925. „ Daday, Ann. Sci. Nat., ser. 10, vol. viii, p. 145
(species not dealt with).

Hinge-line of shell not serrate. Eighteen or twenty pairs of legs.
Lower distal angle of telson produced in an acute point (Daday).

Eulimnadia africana (Brauer).

(Text-fig. 29.)

1877. *Limnadia africana*. Brauer, SB. K. Ak. Wiss. Wien, lxxv, p. 608, pls. vii, viii.
 1913. *Eulimnadia* „ Daday, Voy. Alluaud Afr. orient. Phyll., p. 3.
 1913. „ „ *Id.*, *loc. cit.*, p. 586 (defined in key to species) (in Hungarian).
 1924. „ „ Barnard, Ann. S. Afr. Mus., xx, p. 223.

Shell oval, hinge-line slightly convex in ♂, more strongly so in ♀, anterior margin rounded and extending beyond anterior end of hinge-

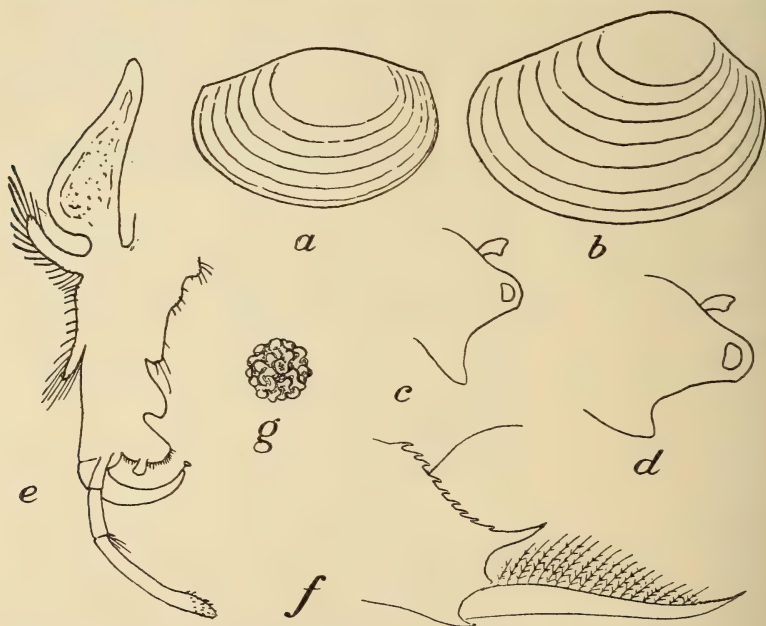


FIG. 29.—*Eulimnadia africana* (Brauer). —a, b, Lateral view of shell of ♂ and ♀ respectively; c, d, head of ♂ and ♀ respectively; e, 1st leg of ♂; f, telson and caudal furca (only one side drawn in); g, ovum.

line; growth-lines 6–7 in number, usually very indistinct, converging at anterior end, surface smooth, very minutely pitted. Rostrum in ♂ bluntly acute, in ♀ quadrate or rounded-quadrate. Eighteen pairs of legs. Tactile process (Calman) or endopodital palp (Daday) elongate,

longer on 2nd leg than on 1st, 2-jointed, 2nd joint longer than 1st, apically obliquely truncate and minutely setulose. Filamentous appendages (dorsal lobes of exopods) on 9th and 10th pairs of legs in ♀. Lower distal angle of telson produced in a short point; teeth on dorsal margin subequal in size. Caudal style with long plumose setae for nearly whole length, except near apex where the margin is minutely serrulate. Posterior 12 (about) segments each with medio-dorsal tufts of setae, much larger in ♀ than ♂, where they pass into a single short spine on each of the last 3 or 4 segments. Ova spherical, rugulose.

Dimensions.—♂ 8.5 × 5 mm.; ♀ 9.5 × 7 mm.

Colour.—Pale horny, more or less tinged with green.

Locality.—Cape Province: Kimberley (Kimberley Mus.).

Bechuanaland: Lobatsi (J. H. Power).

Transvaal: Rietfontein; Heidelberg.

Rhodesia: Bulawayo (Rhodesia Mus.).

Great Namaqualand: Great Fish River near Gibeon.

Ovamboland: widely distributed (Barnard).

Kaokoveld: Choabendus.

Distribution.—Sudan (Brauer); British East Africa (Daday).

The tooth on the margin of the "hand" of the prehensile legs is much less strong in Brauer's figure than in the South African specimens. The ova are comparable with those figured by Sayce (1903, Tr. Roy. Soc. Vict., xv) for *E. rivolensis* (= *Limnadia sordida*).

FAM. CYZICIDAE.

Limnadiidae (part) and *Estheriidae* (part) auctorum.

1900. *Estheriidae* (part). Sars, Arch. Naturv. Krist., xx, No. 9, p. 10.

1910. *Cyzicidae* (part). Stebbing, Ann. S. Afr. Mus., vi, p. 486.

1913. *Caenestheriidae*. Daday, Math. Term. Ert., xxxi, pp. 566, 567 (in Hungarian).

1915. ,, *Id.*, Ann. Sci. Nat., ser. 9, vol. xx, p. 49 (revision).

Shell thin, pellucid (but often rendered opaque with extraneous matter), laterally compressed, ovate in outline, with numerous and distinct growth-lines and more or less distinct surface sculpturing. Head without frontal appendage, with distinct fornix on each side extending to apex of rostrum. Rostrum unarmed, or with a minute

apical spinule in the young which may persist in adult ♀, but not in adult ♂. Eyes contiguous. First antenna long, with numerous lobes on anterior margin bearing sensory setae. Second antenna strong. Twenty to twenty-seven pairs of legs; 1st and 2nd pairs in ♂ prehensile, 9th and 10th pairs in ♀ ovigerous. Caudal furca claw-like. Foremost tooth on upper margin of telson larger and stronger than the following ones.

In examining the surface sculpturing the shell should in the first place be dried and observed by reflected light; but it should also be examined by transmitted light, and for this purpose the membrane on the inner side of the shell must be carefully removed.

The family should take its name from the oldest genus (*Cyzicus*), not from Daday's own genus.

Brief mention may be made of the fossil representatives of this order which occur in South Africa.

As the animal within the shell is not preserved (except in the case of *Limnetheria*, Wright, 1920) fossil species cannot with any certainty be ranged in the present-day families, though by a comparison of the shell characters we can perhaps say that the *Lynceidae*, *Cyclestheriidae*, and *Limnadiidae* have no fossil representatives, at least in South Africa.* The other two families, the *Cyzicidae* and *Leptestheriidae*, are scarcely distinguishable on shell characters alone, and we may therefore regard all the fossil species of "Estheria" as members of the former family.

As the name *Estheria* (Rüppell, 1837) is preoccupied (1830, Robineau-Desvoidy, Diptera) and the fossil species are not referable to any particular modern genus, Daday has proposed the name *Palaeestheria*. In 1912 Deperet and Mazeran (Bull. Soc. d'Hist. nat. d'Autun, xxv, p. 173) have subdivided the genus "Estheria" into groups. The group containing the majority of fossil species is characterised by the numerous regular concentric ribs, and is named *Euestheria*. I have not seen this paper, but apparently the name *Euestheria* is not to be regarded as a properly constituted generic or subgeneric name; it does not appear in the International Catalogue. Therefore Daday's name *Palaeestheria* should stand.

The following South African forms have been discovered.

* Reference, however, may be made to Mitchell, Proc. Linn. Soc. N.S.W., lii, 2, p. 105, 1927. Some of the fossil species described in this paper, e.g. *Estheria glenteensis*, pl. ii, fig. 6, and *E. lenticularis*, pl. iii, fig. 7, might justly be regarded as representatives of the *Limnadiidae* and *Cyclestheriidae* respectively, judging by the figures.

Gen. PALAEESTHERIA Daday.

1915. Daday, Ann. Sci. Nat., ser. 9, vol. xx, p. 51.

† *Palaeestheria anomala* (Jones).

1901. Jones, Geol. Mag., dec. 4, vol. viii, p. 352, text-figs. 1-4.

A shortly oval or subrotund species, 5×3 mm., with a rather short hinge and no visible sculpture.

From the Enon Conglomerate at Heidelberg, Cape.

† *Palaeestheria draperi* (Jones and Woodw.).

1894. Jones and Woodward, Geol. Mag., dec. 4, vol. i, p. 289, pl. ix, figs. 1, *a-c*.

1894. *Id.*, *ibid.*, p. 290, pl. ix, figs. 2, *a, b* (*stowiana*).

1901. Jones, Geol. Mag., p. 354.

1924. Haughton, Ann. S. Afr. Mus., xii, p. 326 (*Cyzicus* (*Euestheria*) *draperi*).

Suboblong, hinge-line straight, up to 16×10.5 mm., interspaces between the ridges with coarse shallow pits.

From shale-band in the Cave Sandstone, at Harrismith, Orange Free State, and Wodehouse, Cape.

The small specimens described as *stowiana* were originally regarded as possibly the young of *draperi*, but in 1901 Jones maintained their distinctness on the ground that the full complement of ridges is present. Haughton unites both forms.

† *Palaeestheria greyi* (Jones).

1879. Jones, Geol. Mag., dec. 2, vol. v, p. 100, pl. iii, fig. 1.

A minute species, $\frac{1}{6} \times \frac{1}{10}$ inch, in shape somewhat resembling a *Limnadia*, but with numerous ridges. No visible sculpture.

From the Karroo Beds near Cradock.

† *Palaeestheria* sp.

Specimens of a *Palaeestheria* are in the Geological Survey Collection (Nos. 312-319 W), from the Lower Beaufort Beds, at Bosch Hoek near van Reenen's Pass, Orange Free State.

† *Palaeestheria* sp.

Some large specimens, 16–23 mm. in length, were collected by Dr. S. H. Haughton from the Cretaceous (Wealden) at Port Elizabeth. They show very numerous growth-lines, but no definite intervening sculpture; they are comparable with *elliptica* Dnkr. from the Wealden of Europe.

Gen. *LEAIA* Jones.

1862. Jones, Monogr. Foss. Estheria.

This genus is characterised by having two radiating ribs from the umbo to the lower margin. No living genus with similar shell characters is known.

† *Leaia* sp.

Specimens of this genus are in the collection of the Geological Survey (Nos. 298–311 W), from the Lower Beaufort Beds, 2 miles S. of Mooi River Station, Natal.

The largest is 7.5×4 mm.; ovate, hinge straight in some specimens, curved in others; umbo at anterior third; anterior radiating rib runs perpendicularly to the hinge-line, the other rib nearly bisects the angle between the anterior rib and the hinge-line; faint concentric striae are visible, but the direction of them does not appear to be abruptly altered by the ribs, at least not by the anterior rib, as in typical *Leaia*.

Key to the South African genera.

1. Rostrum in both sexes acute. Occipital angle of head (in adult) acutely pointed *Caenestheriella*.
2. Rostrum in ♀ acute, in ♂ apically dilated, truncate, securiform. Occipital angle rounded or rounded-quadrate *Eocyclus*.

Gen. *CAENESTHERIELLA* Daday.

1913. *Caenestheriella*. Daday, Math. Term. Ert., xxxi, pp. 567, 570 (key to species in Hungarian).

1915. „ *Id.*, Ann. Sci. Nat., ser. 9, vol. xx, p. 106.

Head with occipital angle in both sexes more or less acutely produced. Rostrum in both sexes apically acute. Teeth and spines on margin of telson spinulose.

Distributed over all continents except South America.

Daday (1915) has admitted 20 species to this genus, of which 11 are described as new. It seems reasonable to think that some of these will later be united. I am unable to find, *e.g.*, constant differences in the 3 South African species admitted by Daday.

Caenestheriella australis (Loven).

(Text-fig. 30.)

1847. *Cyzicus australis*. Loven, K. Vet. Ak. Handl. for 1845,
p. 428, pl. iii.
1898. *Estheria elizabethae*. Sars, Arch. Naturv. Krist., xx, No. 4,
p. 33, pl. iv.
1905. „ „ *Id.*, *ibid.*, xxvii, No. 4, p. 3.
1910. *Cyzicus australis* and *elizabethae*. Stebbing, Ann. S. Afr. Mus.,
vi, p. 487.
1915. *Caenestheria* (?) *australis*. Daday, *loc. cit.*, p. 98, fig. 15.
1915. *Caenestheriella vidua*. *Id.*, *ibid.*, p. 122, fig. 21.
1915. „ *joubini*. *Id.*, *ibid.*, p. 148, fig. 29.
1915. „ *elizabethae*. *Id.*, *ibid.*, pl. clxxv, fig. 37.
1924. „ *elizabethae*, *joubini*, and *vidua*. Barnard,
Ann. S. Afr. Mus., xx, pp. 225, 226.

Shell ovate, hinge-line forming a slight angle with posterior margin in ♀, this angle in ♂ obsolete, growth-lines forming strong ribs more or less closely set with fine setae, especially in young; sculpturing consisting of closely set fine punctures, which are arranged more or less in regular transverse lines leaving pellucid intervals, at least at front and hind ends and near central margin, but the linear arrangement often not too well marked, especially in the younger portions of the shell. Rostrum apically subacute in ♂, in ♀ acute and curved slightly forwards, in young very acutely pointed; at the apex of the groove formed by the fornices there is in the young a short stout spine (fig. 30, *f*) which in adult ♀ is much smaller and scarcely, if at all, projects beyond the margins of the fornices, or even becomes quite obsolete; in adult ♂ it is nearly always obsolete. I have seen a minute vestige of it in one specimen from Bulawayo, one from Gibeon, and one from Port Elizabeth. Occipital angle in young much less acutely produced than in adult. Telson with the two claws asymmetrical in ♂.

Dimensions.—Up to 10×6 mm.

Colour.—Shell corneous, animal reddish.

Locality.—Cape Province : Port Elizabeth (Sars) ; Hanover (Sars) ; Kimberley (Kimberley Mus.) ; Queenstown (Daday) ; Hutchinson ; Prince Albert ; Beaufort West ; Molteno ; Prieska ; Kenhardt ; Langklip, Narugas Siding, and Omdraaiputz (all three in the Gordonias District). Bechuanaland : Kalahari, several localities (Daday) ; Asbestos Mts. (J. H. Power). Orange Free State : Kroonstad (Gurney) ; Bloemfontein (Daday, and Albany Mus.). Transvaal : “ in paludibus terrae Caffrorum Natalensium (Loven).” Blaauwberg (Albany Mus.) ; Witbank ; Brakpan ; Heidelberg ; Wolmaranstad. Rhodesia : Bulawayo (Rhodesia Mus.). Great Namaqualand : Great Fish River near Gibeon ; Keetmanshoop ; Kalkfontein South. Damaraland : Windhoek (Daday). Ovamboland : several localities (Barnard). Kaokoveld : Kamanyab.

Type of *australis* in Stockholm Museum ; of *elizabethae* in South African Museum ; of *vidua* in Berlin Museum ; of *joubini* in Paris Museum.

In the first place I agree with Wolf's opinion (*cf.* Daday, *loc. cit.*, p. 152) that *elizabethae* is synonymous with *australis*. Loven has figured the essential outstanding features of this widely distributed species, viz. the setose growth-lines of the shell and the acute rostrum. Young female specimens in particular correspond with Loven's words “ angulo acuto terminatum spina armato.” These words might be taken as applicable to *Leptestheria* but for the shape of the 1st leg of the ♂ figured by Loven. From the size and the rounded occipital angle of the head Loven's specimens were evidently not full grown.

As regards Daday's species *vidua* and *joubini*, after the examination of a large amount of material from numerous localities, I am unable to appreciate the constancy of the characters relied upon for distinguishing these forms from one another and from *elizabethae*.

The typical arrangement of the punctures on the shell is not always well seen, especially in young specimens ; it is best seen in adult shells at each end and near the ventral margin. The presence or absence of an angle where the hinge-line meets the posterior margin is, as Sars pointed out, largely a sexual character. The actual shape of the head is variable in both sexes ; the rostrum in some ♂♂ being

* See note on locality under *Streptocephalus cafer*.

comparatively stout (Daday's figure of *joubini*), in others slender (Daday's figure of *elizabethae*); the angle of the fornix just below the eye in ♀ may be very conspicuous (*vidua*), but I have seen all variations between this and the inconspicuous angle in *joubini*. Females with stout rostra occur in the same locality along with males with slender

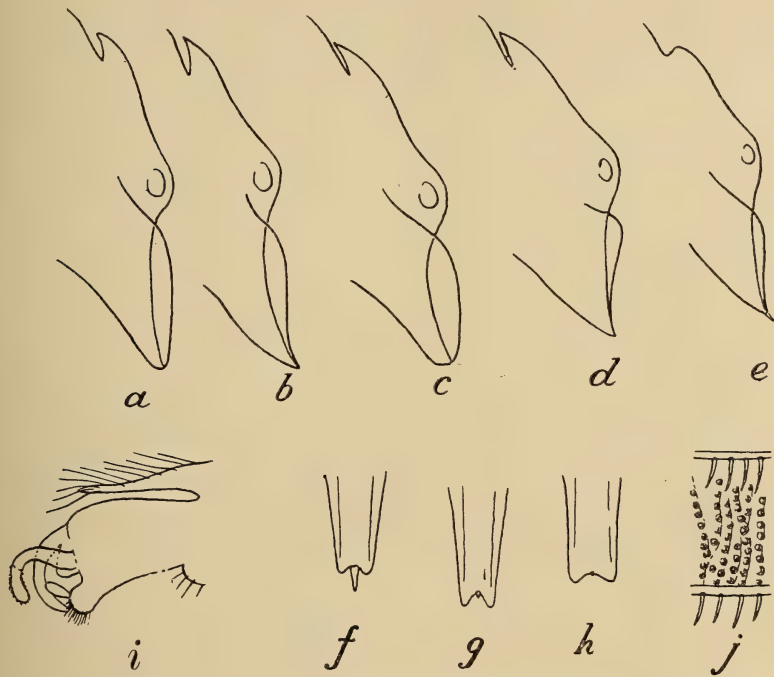


FIG. 30.—*Caenestheriella australis* (Loven). *a, c*, Heads of ♂; *b, d*, heads of ♀; *e*, head of young; *f*, apex of rostrum of young; *g*, apex of rostrum of adult ♀; *h*, apex of rostrum of adult ♂ (Bulawayo); *i*, 1st leg of ♂; *j*, sculpture of shell.

rostra. In general, the larger the specimen the more slender the rostrum in both sexes.

According to Daday the margin of the branchial epipod in *joubini* is entire, in *elizabethae* more or less crenulate, in *vidua* crenulate; obviously not a decisive character.

The number of lines of growth is also an unreliable character.

C. paradoxa Daday, founded on a young female from the Niger River, shows the same projecting point or spine at the apex of the rostrum as does the young of *australis*; and I am inclined to think that *paradoxa* may also prove to be synonymous with *australis*.

This is a very widely distributed species. The animals are more

sedentary than some of the other Conchostraca, lying embedded in the mud with the dorsal surface downwards, and the ventral margins of the shell just flush with the surface of the mud.

Gen. *Eocycticus* Daday.

1913. *Eocycticus*. Daday, Math. Term. Ert., xxxi, pp. 567, 574 (key to species in Hungarian).

1915. „ *Id.*, Ann. Sci. Nat., ser. 9, vol. xx, p. 190.

Head with the occipital angle in both sexes rounded or rounded-quadrate. Rostrum in ♀ acute, in ♂ apically dilated, securiform, rounded or truncate. Teeth and spines on margin of telson simple, smooth.

Mainly in Africa, but also in Asia and North America.

Key to the South African species.

1. Size about 6-7 mm.

a. Rostrum in ♂ with anterior angle slightly less than a right angle. Margin of hand of ♂ slightly notched. Telson with fine denticles . *obliquus*.

b. Rostrum in ♂ with anterior angle a right angle. Margin of hand deeply notched. Telson with strong denticles and claws . *dentatus*.

2. Size about 13 mm. Rostrum in ♂ with anterior angle an obtuse angle. Margin of hand deeply notched. Telson with fine spiniform denticles . *gigas*.

Eocycticus obliquus (Sars).

(Text-fig. 31, *a-c*.)

1905. *Estheria obliquus*. Sars, Arch. Naturv. Krist., xxvii, No. 4, p. 10, pl. ii.

1910. *Cyzicus* „ Stebbing, Ann. S. Afr. Mus., vi, p. 487.

1915. *Eocycticus* „ Daday, *loc. cit.*, p. 222, fig. 50.

Shell ovate, deeper anteriorly, dorsal margin straight, passing imperceptibly into hind margin, growth-lines rather faint, forming low smooth ridges; sculpturing faint, consisting of very shallow ovoid or polygonal pits. Rostrum in ♀ triangular, apex subacute; in ♂ somewhat quadrangular, apex (anterior angle) rounded-quadrate, posterior angle broadly rounded and bevelled off. Profile of head from occipital angle to eye straight. Twenty-two pairs of legs. Anterior (inner) margin of the “hand” of prehensile legs in ♂ with a slight notch. Telson with the claws scarcely, if at all, asymmetrical in

♂, rather slender, smooth, preceded by about 12 small unequal denticles.

Dimensions.—Up to 7×4.5 mm.

Colour.—Shell corneous, animal pale yellowish white.

Locality.—Cape Province : Hanover (Sars).

Transvaal : Potchefstroom.

Type ubi ?

I have seen only Potchefstroom examples of this species ; apparently

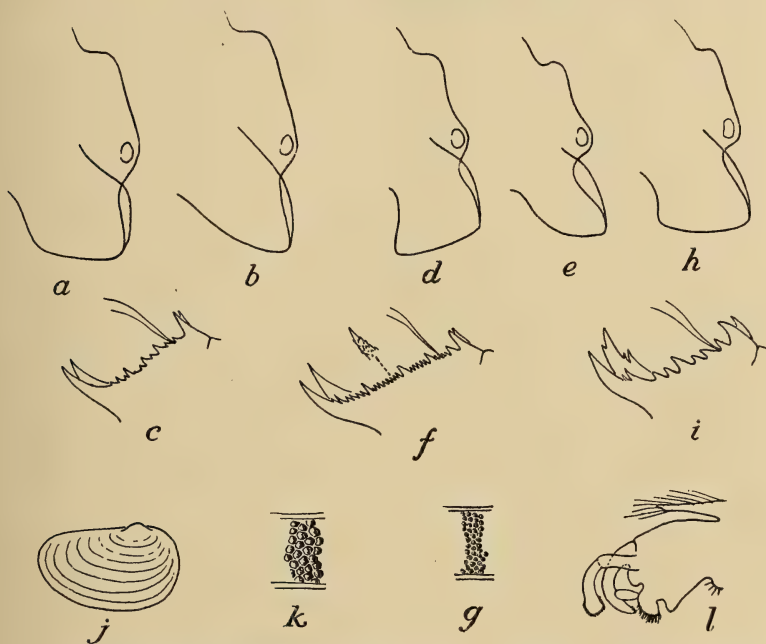


FIG. 31.—*Eocyclus obliquus* Sars: a, Head of ♂; b, head of ♀; c, telson. *E. gigas* Brndr.: d, Head of ♂; e, head of ♀; f, telson; g, sculpture of shell. *E. dentatus* n. sp.: h, Head of ♂; i, telson; j, shell; k, sculpture of shell; l, 1st leg of ♂.

none of the original set were returned to this Museum by Sars. Sars' description of the sculpturing of the shell was inadequate or even inaccurate; it is more difficult to observe in this species than the others.

Eocyclus dentatus n. sp.

(Text-fig. 31, h-l.)

♂.—Shell ovate, deeper anteriorly, dorsal margin passing imperceptibly into hind margin, growth-lines rather faint, smooth; sculp-

turing consisting of irregularly ovoid, subcircular, or polygonal depressions, with intervening narrow raised network. Rostrum quadrangular, hind angle rounded-quadrate. Profile of head from occipital angle to eye straight. Twenty-two pairs of legs. Anterior (inner) margin of "hand" of prehensile leg of ♂ with a deep notch. Telson with the claws markedly asymmetrical, strong, the left one with accessory teeth on the anterior and posterior margins, the right one less strongly curved and with an accessory tooth on anterior margin; 6-7 strong triangular denticles on upper margin, the foremost one very strong.

Dimensions.— 6×4 mm.

Colour.—Shell corneous.

Locality.—Cape Province: Hanover.

Type in South African Museum.

The single ♂ specimen on which this species is founded was collected at the same locality as *E. obliquus*, but whether or not in the same pool is not recorded. It was recognised by the late Dr. Purcell as being different from the other four specimens he received from Hanover, but he did not send it to Sars.

The characters of the animal are so markedly distinct from those of *obliquus* that one can hardly doubt that it represents a separate species and not merely a variety of the latter. The telson, in fact, is quite distinct from that of any of the other species of the genus mentioned in Daday's monograph. Further specimens, however, would be welcome.

Some empty valves from Hutchinson (Cape Province) show the same sculpturing as this species, but in the absence of the animals, it is impossible to assign them definitely to one or the other species.

Eocyclus gigas Brnrd.

(Text-fig. 31, *d-g.*)

1924. *Eocyclus gigas*. Barnard, Ann. S. Afr. Mus., xx, p. 226, pl. xxvi, figs. 16, 17.

Shell ovate, deeper anteriorly, dorsal margin passing imperceptibly into hind margin, growth-lines rather faint, smooth; sculpturing consisting of small closely aggregated pits (smaller than those in *dentatus*) with intervening narrow network. Rostrum in ♀ triangular, apex subacute; in ♂ quadrangular, apex obtuse-angled, hind angle rather bluntly produced. Profile of head from occipital angle to eye

concave, more so in ♂ than in ♀. Twenty-one to twenty-two pairs of legs. Anterior (inner) margin of "hand" of prehensile leg of ♂ with a deep notch, but in young specimens (6 mm. long) straight or slightly sinuous. Telson with the claws slightly asymmetrical in ♂; upper margin with numerous fine spiniform denticles.

Dimensions.— 13×8.5 mm.

Colour.—Shell corneous with slight greenish tinge, animal pale ochreous.

Locality.—Ovamboland: Ukualuthi and Ukualonkathi (about 100 miles N.W. of Ondongua).

Type in South African Museum.

The large size and the shape of the head distinguishes this species from all the others of the genus.

FAM. LEPTESTHERIIDAE.

Limnadiidae (part) and *Estheriidae* (part) auctorum.

1910. *Cyzicidae* (part). Stebbing, Ann. S. Afr. Mus., vi, p. 486.

1913. *Leptestheriidae*. Daday, Math. Termt. Ert., xxxi, pp. 566, 579.

1915. ,, *Id.*, Ann. Sci. Nat., ser. 9, vol. xx, p. 48.

1923. ,, *Id.*, *ibid.*, ser. 10, vol. vi, p. 255 (revision).

Shell pellucid (but often rendered opaque with extraneous matter), laterally compressed, ovate-oblong, with numerous and distinct growth-lines, and more or less distinct surface sculpturing. Head without frontal appendage, with distinct fornix on each side extending to apex of rostrum. Rostrum armed with a distinct apical spine in both sexes. Eyes contiguous. First antenna long, with numerous lobes on anterior margin bearing sensory setae. Second antenna strong. Twenty-two to thirty-two pairs of legs; 1st and 2nd pairs in ♂ prehensile; exopod (Sars) or dorsal lobe of epipod (Daday) of 9th pair in ♀ filiform; on the 10th–11th, 10th–12th, 10th–13th, 10th–14th, or 10th–15th pairs this lobe is cylindrical, ovigerous. A triangular epipodal lamina present on some of the anterior pairs of legs in both sexes. Caudal furca claw-like. Foremost tooth on upper margin of telson not large or stronger than the following ones.

Europe, Asia, North and Central America, Africa.

The chief reasons for the institution of this family are the presence of the triangular epipodal lamina on the legs, and the presence of the

spine at the apex of rostrum. The first character is certainly distinctive, but the second loses much of its value from the fact that a similar and evidently homologous spine occurs in at least two of the species of *Caenestheriella*, viz. *australis* and *crinita*.

In *Caenestheriella* it is present only in the young, and if it persists at all, it is only in a reduced or vestigial state. In the members of this family it is much stronger and always persists in both sexes.

Daday mentions three other distinguishing features of this family (*loc. cit.*, p. 257): the development of the cylindrical process on two or more of the 10th–15th pairs of legs in ♀ to support the egg-mass, the character of the spines on the margin of telson, and the shape of the shell. These three characters, with the exception perhaps of the first, seem scarcely of sufficient importance for family distinctions.

The enlargement of the foremost tooth or spine on the upper margin of the telson in the *Cyzicidae* is a useful "first aid" in identification; in the present family the foremost tooth or spine is not larger than the others.

Key to the South African genera.

- | | |
|--|--------------------------|
| 1. Margin of the exopods (branchial epipods) of legs entire . . . | <i>Leptestheria</i> . |
| 2. Margin of the exopods with digitate, setiferous processes . . . | <i>Leptestheriella</i> . |

Gen. LEPTESTHERIA Sars.

- | | |
|-----------------------------|--|
| 1898. <i>Leptestheria</i> . | Sars, Arch. Naturv. Krist., xx, No. 6, p. 9. |
| 1900. ,, | <i>Id.</i> , <i>ibid.</i> , xx, No. 9, p. 10. |
| 1910. ,, | Stebbing, Ann. S. Afr. Mus., vi, p. 488. |
| 1913. ,, | Daday, Math. Termt. Ert., xxxi, p. 580 (in Hungarian). |
| 1923. ,, | <i>Id.</i> , Ann. Sci. Nat., ser. 10, vol. vi, p. 276. |

Head with occipital angle acutely produced; rostrum often broader in ♂ than in ♀, but usually not differing greatly in the two sexes. Twenty-two to twenty-six pairs of legs; margin of the exopod (or branchial epipod as Daday calls it) entire; dorsal lobe of exopod cylindrical on two or more of the 10th–15th pairs of legs in ♀.

Key to the South African species.

- | | |
|--|------------------------|
| 1. Shell-sculpturing reticulate or areolate. | |
| a. Occipital angle of head moderately produced . . . | <i>rubidgei</i> . |
| b. Occipital angle considerably produced. Rostrum very short | <i>brevirostris</i> . |
| 2. Shell-sculpturing striate | <i>striatoconcha</i> . |

Leptestheria rubidgei (Baird).

(Text-fig. 32, a-f.)

1862. *Estheria rubidgei*. Baird, Proc. Zool. Soc. Lond., p. 148,
pl. xv, figs. 3-3b.
1862. „ *macgillivrayi*. *Id.*, *ibid.*, p. 148, pl. xv, figs. 5-5b.
1898. *Leptestheria siliqua*. Sars, Arch. Naturv. Krist., xx, No. 6,
p. 11, pls. ii, iii.
1899. „ „ *Id.*, *ibid.*, xxi, No. 4, p. 23, pl. iii.
1910. „ „ Stebbing, Ann. S. Afr. Mus., vi, p. 488.
1923. „ *braueri*. Daday, Ann. Sci. Nat., ser. 10, vol. vi,
p. 280, fig. 84 (juv.).
1923. „ *gigantea*. *Id.*, *ibid.*, p. 284, fig. 85.
1923. „ *siliqua*. *Id.*, *ibid.*, p. 300, fig. 90.
1923. „ *macgillivrayi* and *rubidgei*. *Id.*, *ibid.*, pp. 350,
351, figs. 103, 104 (“species insuffic-
ienter cognitae”).

Shell ovate or ovate-oblong, deeper anteriorly, dorsal margin straight, forming a distinct angle with the hind margin, growth-lines numerous but not prominent, finely setulose, more so in young than in adult; sculpturing consisting of closely aggregated depressions of varying shape and size, the intervening raised borders of the depressions forming a reticulate or areolate pattern, which is larger and more areolate on the younger portions of the shell, smaller and more regularly reticulate towards the margins in adult shells. Rostrum in ♂ sometimes narrower, sometimes broader, apically rounded or sometimes subquadrate; in ♀ subtriangular, apically subacute. Occipital angle shortly produced. Profile between occipital angle and eye convex, concave, or sinuate. Segments 26-28, of which 23-24 are pedigerous, the posterior 2-3 segments often apodous. Anterior (inner) margin of “hand” of prehensile leg of ♂ with a moderate, or a deep, notch in adult; nearly straight in young. Tenth and eleventh pairs of legs in ♀ with cylindrical dorsal lobe of exopod. Spines and setae on posterior segments very variable, often much stronger than shown in Sars’ figures, the hindmost 2-4 segments often without any armature at all. Spines on upper margin of telson numerous, subequal, closely set.

Dimensions.—Up to 12×7 mm.

Colour.—Shell corneous, animal pale yellowish or ochreous.

Locality. Cape Province : Cape Town (Sars) ; Port Elizabeth (Sars, Daday) ; Hanover (Sars) ; Bushmanland=Little Namaqualand (Sars) ; Grahamstown (Albany Mus. and Natal Mus.) ; Cape Flats ; Prinskraal, Bredasdorp Div. ; Pofadder, Kenhardt Div. ; Upington ; Beaufort West Division ; Pocaltsdorp ; Gouritz River railway bridge.

Basutoland : Morajia.

Bechuanaland : Kalahari (Daday : *braueri*).

Transvaal : Rietfontein ; Heidelberg.

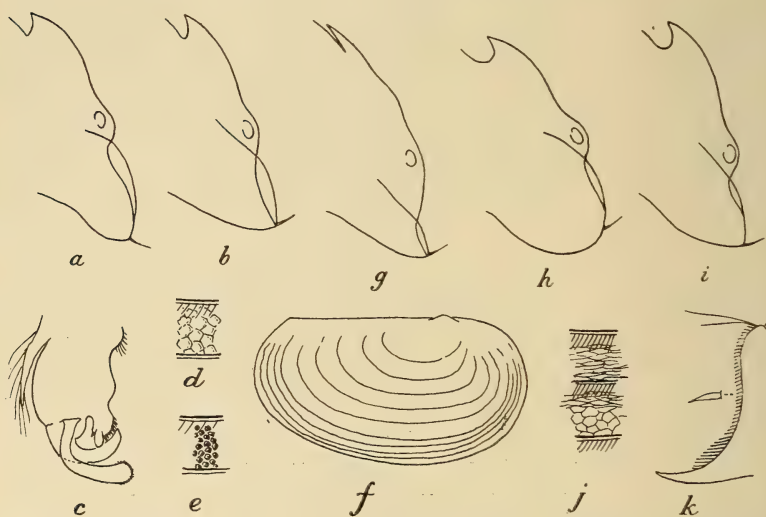


FIG. 32.—*Leptestheria rubidgei* (Baird): *a*, Head of ♂; *b*, head of ♀; *c*, 1st leg of ♂; *d*, *e*, sculpture of shell, young and old portions respectively; *f*, shell. *L. breviostris* Brnrd.: *g*, Head of ♀. *L. striatoconcha* Brnrd.: *h*, Head of ♂; *i*, head of ♀; *j*, sculpture of shell; *k*, telson.

Distribution.—Daday believed that the specimens from Russia and Transcaucasia, referred by Zograff to this species (1907, Zeit. wiss. Zool., lxxxvi, p. 449), were more likely to be *rotundirostris*. Thiele's record of *siliqua* from the Massai Nyika (1900, Zool. Jahrb. Abt. Syst., xiii, p. 571) is referred to by Daday in 1913 (Voy. Alluaud Afr. orient. Phyllop., p. 3) and again in his revision (1923, *loc. cit.*, p. 304). In the latter work, however, he describes (*loc. cit.*, pp. 370, 375) some specimens from the identical locality as *Leptestheriella thielei*. One has to assume therefore that the material collected by Neumann and recorded by Thiele contained two species, and that *siliqua* (*rubidgei*) occurs also in the East African region.

Types of *rubidgei* and *macgillivrayi* in British Museum, of *siliqua* in South African Museum, of *braueri* in Berlin Museum, of *gigantea* in Vienna Museum.

There can be no reasonable doubt that *siliqua*, recorded from Cape Town and Port Elizabeth, is synonymous with *rubidgei* and *macgillivrayi* from the same two localities. At the time Sars wrote it might have been urged that our knowledge of the South African Conchostraca and their distribution was not far enough advanced to exclude the possibility of two species (of similar shell characters) being found in the same locality. To-day our knowledge is by no means so far advanced as to be conclusive. But since in these two localities, especially Cape Town and its environs, no species resembling Baird's two species, except *siliqua*, has been reported, the conclusion seems justified that *siliqua* is, in fact, the same as Baird's species. As *rubidgei* has line and figure precedence over *macgillivrayi*, the former name should be used.

This species is a variable one, as can be seen from the diagnosis. In the specimens from Rietfontein the rostrum is especially broad, apically rounded, or even subquadrate, thus resembling some forms of the equally variable *dahalacensis*. Further, I have seen one ♀ from Heidelberg (Transvaal), with a perfectly oval outline to the shell, without any angle between the dorsal and hind margins.

Leptestheria brevirostris Brnrd.

(Text-fig. 32, g.)

1924. *Leptestheria brevirostris*. Barnard, Ann. S. Afr. Mus., xx, p. 227, pl. xxvi, fig. 18.

Shell similar in form and sculpturing to that of *rubidgei*. Rostrum (♀) very short, apically acute; occipital angle strongly and acutely produced. Twenty-three pedigerous segments. Tenth and eleventh pairs of legs in ♀ with cylindrical ovigerous exopods. Spines on upper margin of telson subequal, rather widely spaced. Dorsal surface of last 3 or 4 segments minutely granulate as well as setiferous.

Dimensions.— 4.5×2.5 mm.

Colour.—Pale corneous.

Locality.—Damaraland: Waterberg, E. of Otjiwarongo.

Type in South African Museum.

Founded on an ovigerous ♀ and a young ♀; distinguished from *rubidgei* by the produced occipital angle and the short rostrum.

Leptestheria striatoconcha Brnrd.(Text-fig. 32, *h-k*.)

1924. *Leptestheria striatoconcha*. Barnard, Ann. S. Afr. Mus., xx, p. 227, pl. xxvi, fig. 19.

Shell ovate or ovate-oblong, deeper anteriorly, dorsal margin forming a distinct angle with posterior margin, growth-lines numerous, setulose, especially in young; sculpturing consisting of raised subcontinuous striae enclosing elongate fusiform depressions, striae longitudinal anteriorly and in the middle, becoming transverse posteriorly; on the outer margin the striae tend to form an irregular reticulation, the depressions becoming more or less polygonal. Rostrum in ♂ stout, broadly rounded apically; in ♀ narrower, apically subacute. Occipital angle shortly produced. Twenty-two to twenty-three pairs of legs. Anterior (inner) margin of "hand" of prehensile leg of ♂ deeply notched. Tenth and eleventh pairs in ♀ with cylindrical dorsal lobes of exopods. Upper margin of telson with numerous closely set spines, subequal proximally, but becoming long distally at the base of the apical claw.

Dimensions.—Up to 9×6 mm.

Colour.—Shell corneous, animal pale yellowish, ova salmon-coloured.

Locality.—Ovamboland: widely distributed (Barnard).

Transvaal: Heidelberg.

Type in South African Museum.

This species is very closely allied to the Northern African *mayeti* Simon; in fact, the only real difference seems to be in the spines on the upper margin of telson, which are all nearly uniform in size in *mayeti*. The absence of spines or setae from the posterior 3-7 segments in *mayeti* may prove to be an inconstant character as it is in *rubidgei*.

There are two other North African forms with striate shell-sculpturing: *cortieri* Daday and *aegyptiaca* Daday. They differ in having the 10th-13th and 10th-14th pairs of legs respectively with cylindrical ovigerous exopods in ♀.

Gen. LEPTESTHERIELLA Daday.

1913. *Leptestheriella*. Daday, Math. Termt. Ert., xxxi, pp. 579, 583 (key to species in Hungarian).

1923. „ *Id.*, Ann. Sci. Nat., ser. 10, vol. vi, p. 352.

Head with occipital angle acutely produced; rostrum often broader in ♂ than in ♀. Twenty-two to thirty-two pairs of legs. Margins

of exopods of the legs with lobate or digitiform processes. Dorsal lobe of exopod in ♀ cylindrical on 10th and 11th pairs of legs.

Key to the South African species.

1. A strong tooth on ventral surface of telson *calcarata*.
2. No tooth on ventral surface of telson *inermis*.

Leptestheriella calcarata Daday.

(Text-fig. 33, a-d.)

1923. *Leptestheriella calcarata*. Daday, *loc. cit.*, p. 366, fig. 108.

1924. *Leptestheria rubidgei*. Barnard, Ann. S. Afr. Mus., xx, p. 227 (non Baird).

Shell ovate or ovate-oblong, dorsal margin straight, forming an angle with hind margin, growth-lines setulose; sculpturing areolate



FIG. 33.—*Leptestheriella calcarata* Daday: a, Head of ♂; b, head of ♀; c, telson; d, 3rd leg of ♂. *L. inermis* n. sp.: e, Head of ♂; f, head of ♀; g, telson of ♀; h, 3rd leg of ♂.

with irregular polygonal depressions. Rostrum in ♂ narrowly rounded apically, in ♀ rather broader, apically subquadrate. Occipital angle shortly produced. Twenty-two (♀) to twenty-four (♂) pairs of legs. Anterior (inner) margin of "hand" of prehensile leg of ♂ notched. Margin of exopods with rather long, often bifid, digitiform processes.

Cylindrical exopods of 10th and 11th pairs of legs in ♀ slender. Segments with dorsal armature of spines and setae. Telson with a strong tooth on ventral surface in both sexes, spines on upper margin subequal, smooth.

Dimensions.—Up to 7×4.5 mm.

Colour.—Pale castaneous or whitish.

Locality.—Bechuanaland : Kalahari (Daday).

Great Namaqualand : Great Fish River near Gibeon.

Type in Berlin Museum.

This species is at once distinguished from all the other South African Leptestheriids by the telsonic tooth.

Leptestheriella inermis n. sp.

(Text-fig. 33, e-h.)

Shell similar to that of *calcarata*, but the sculpturing not so coarse. Rostrum in ♂ broadly rounded, in ♀ subquadrate. Occipital angle strongly produced. Twenty pairs of legs. Anterior (inner) margin of "hand" of prehensile leg of ♂ notched. Margins of exopods with short lobe-like processes. Cylindrical exopods on 10th and 11th legs in ♀ very stout. Segments without any dorsal armature of spines or setae in both sexes; posterior 6–7 segments in ♀ raised up into a cockscomb-like ridge. Telson without ventral tooth; upper margin in ♀ minutely crenulate, with a few setae distally, in ♂ perfectly smooth, or with one or two minute denticles proximally.

Dimensions.— 5×3 mm.

Colour.—Shell pale corneous.

Locality.—Cape Province : between Upington and Keimoes.

Type in South African Museum.

This species is well distinguished from all the others by the absence of armature on the dorsal margins of the segments, and its great reduction on the upper margin of telson, especially in the ♂.

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APPENDIX TO *SPELEIACRIS TABULAE*, PÉR.

(See p. 150.)

6. *Additional Notes*.—By A. J. HESSE, Ph.D., F.E.S.,
Assistant in Entomology, S.A. Museum.

DR. H. KARNY has kindly invited me to add a few notes as an appendix to his revision of *Speleiacris* as well as to the descriptions of the late Dr. L. Péringuey on pp. 420, 421 in these *Annals*, vol. xv, 1916.

In view of the poor condition of the type material upon which Dr. Karny worked, Drs. K. H. Barnard, R. F. Lawrence, and I undertook to investigate the Wynberg Cave, the Kalk Bay Cave, and a newly discovered cave in a private garden in Orangezicht, Cape Town, with the object of obtaining more material for the collection. This was done, unfortunately, after Dr. Karny's paper was already in the press. We succeeded in obtaining fresh material from all three caves, but by far the largest number of specimens from the Orangezicht Cave. The caves were explored during February and March, during which months climatic conditions at the Cape are ideal and dry, and thus with no excess of dampness in the caves.

Speleiacris in the fresh condition is dark to very dark sienna brown on the body, the legs being slightly paler and the head often paler still. The mouth parts, the apical joints of the palpi, the apices of the tibiae, the apical spines, and the tarsi are very pale yellowish, inclining to white. The ovipositor in the ♀ is shining, yellowish, pale reddish brown to dark pitchy brown. The entire body is covered with very minute golden yellow setae, which give the insect a slight bronzy or golden, even greasy, sheen, depending on the position it is held in with respect to incident light. The setae very easily become detached, and are denser along the hind margins of the thoracic segments, on the abdomen, and especially dense on the legs. They are different from the longer bristles present on different parts of the body, such as those situated medially on the face just below the antennal insertions, and some of those on the antennal joints, the legs, cerci, etc.

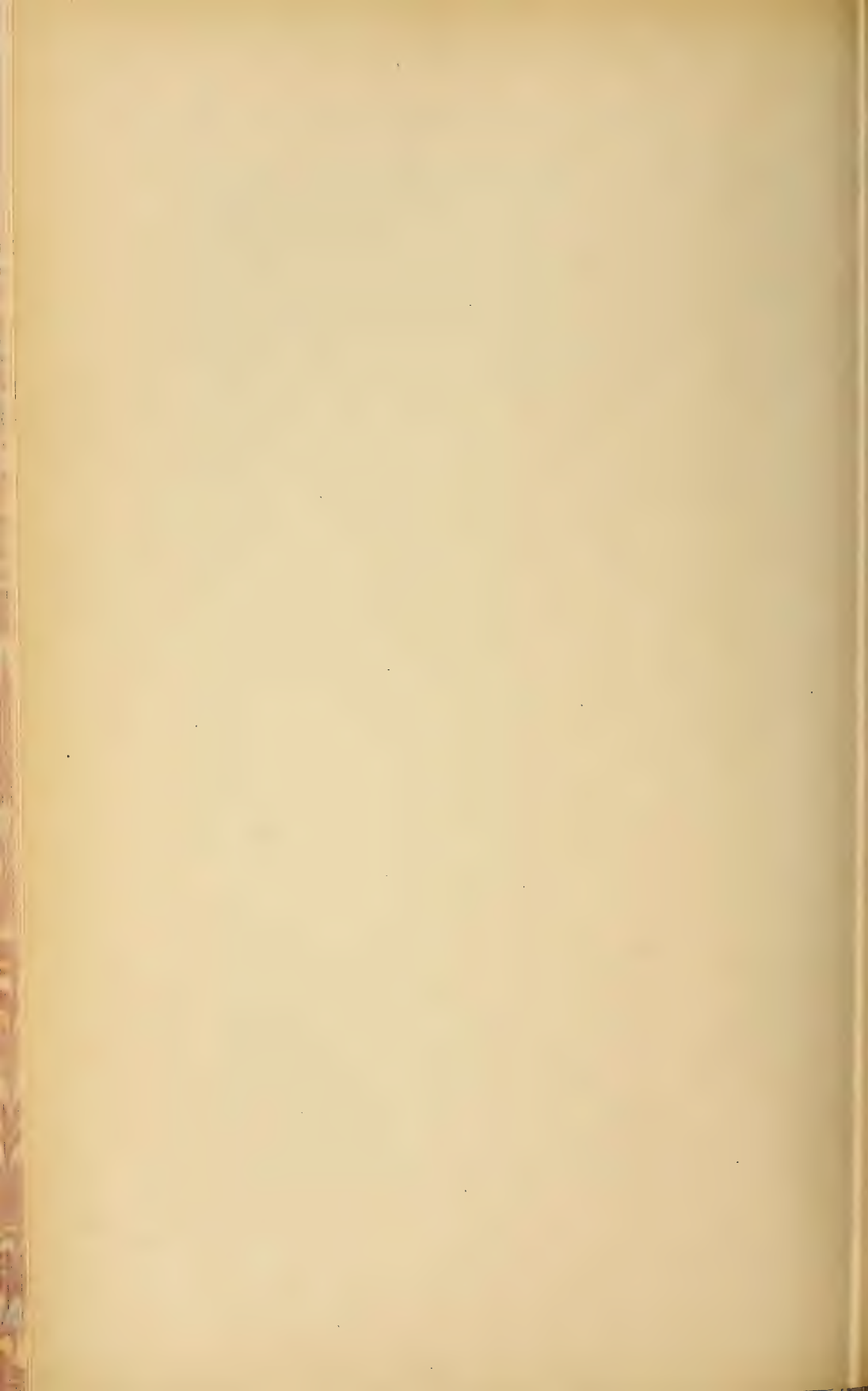
In its peculiar habitat the insect lives only in the innermost cor-

ridors and chambers, where no ray of light penetrates and where no sound is heard. It is found mostly on the rock surfaces, at their bases where the rocky walls jut over, in hollows, crevices, and chasms, or the spaces between contiguous boulders, where there is a maximum amount of dampness and sliminess, but not actual dripping water. They have not been caught or seen on the floors proper or under stones, debris, etc., strewn on the floors. Incidentally, these are the very places where a lichen (*Lecanora* sp.) flourishes best.

By torchlight these Gryllacrids are weird and ghostlike with their long legs and very long and slender antennae. When the light is turned on them they begin to run and always away from the source of the light, generally perpendicularly upwards. The running movements recall those of a spider and their appearance that of a Phalangid. As soon as they are further disturbed, for instance by a movement of the hand, they jump away with great dexterity, and, as a matter of fact, are difficult to catch. The antennae and maxillary palps are continually moved about, the former trembling and vibrating all the time, as if they are attempting to receive all the sense impressions, and the latter feeling and touching the rock surface. In all probability, judging from the active movements of these organs, the antennae are the chief media for the reception of external stimuli in this dark and soundless environment, while the palps (abnormally long), with their terminal cup-shaped cavity, feel and test the surface. The structure of the hind legs, and especially the long apical spines on the tibiae, insure a good grip on the rock surfaces both for running and jumping. The caves in which *Speleiacris* lives are very difficult to enter, as the entrances are very narrow, leading down by shafts, extremely narrow in places. They are composed of a series of corridors and chambers, either small and inaccessible or larger and more roomy. The Orangezicht Cave is in the basal granite of the Table Mountain sandstone; whereas the Wynberg Cave, higher up on top of the mountain, is in the sandstone itself. These caves were not produced solely by the solution of calcium carbonate by subterranean water, as in the case of limestone caves, but are more of the nature of subterranean joints or cracks in the rocks, or of boulders with spaces between them which have become enlarged through subsequent solution. The floors are composed of disintegrated grit and sand, with a slight admixture of mould and humus in the case of the Orangezicht one, and sandy, even muddy, in the Wynberg and Kalk Bay ones. The rock walls are mouldy, slimy, very damp, and in places with water trickling, dripping, and oozing out in crevices

and chasms. The atmosphere in the chambers is very damp and humid, and the temperature would thus be more or less uniform throughout the seasons, conditions which are found in practically all underground caves and which constitute the environment of cave fauna. The only plant we found in the caves was a species of lichen belonging to the genus *Lecanora*, although the exposed rootlets of trees were also observed in the Orangezicht Cave.

Speleiacris was not observed to feed; but, as *Lecanora* is the only plant capable of growing in these caves, the supposition that it feeds on this lichen has some justification.



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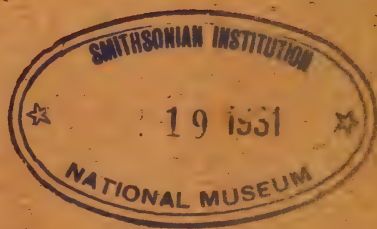
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PART II, containing:—

7. *Contributions to a Knowledge of the Fauna of South West Africa. IX. The Non-Marine Mollusca of South West Africa.* By M. CONNOLLY. (With Plates III and IV and one Text-figure.)
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(i) INTRODUCTION.

CONSIDERING how little was for long known about the fauna under present notice, it is remarkable that the earliest record of it dates back to 1838, when Gray (i) * described the four species now known as *Sculptaria sculpturata*, *Dorcasia alexandri*, *Xerocerastus hottentotus* and *X. eulimoides* from material collected by Sir J. E. Alexander about the Great Fish River in Great Namaqualand, and it is further remarkable that, while the two Helicoid species have never until quite recently been frequent in collections (the present writer paid 4s. for a good specimen of *D. alexandri* less than ten years ago!), the two Zootecoids are still among the rarest of old established African land shells.

No genuine additions were made to this brief list for thirty-two years, when in 1870 H. Adams not only redescribed *X. hottentotus* under the name of *pygmaeus*, but established *Sculptaria damarensis* and *Xerocerastus damarensis*, and Pfeiffer, in ignorance of Adams' paper, also described *X. dammarensis* and its var. *minor*, and added *Achatina dammarensis* to the fauna. The name of the collector is not published, but in both cases is probably R. F. Geale.

Another long lull then occurred until 1886, but from that year inclusive there have been frequent contributions and additions, for the most part by Continental authors, to the mollusca of S.W. Africa and its immediate neighbourhood, while three comparatively comprehensive papers have been written on the subject. In 1889 von Martens (iii) gave a list of 18 species and 2 varieties which were sup-

* Numerals after authors' names refer to the Bibliography.

posed to inhabit the country ; in 1910 O. Boettger (viii) published a valuable work in which he ascribed thereto a total of 35 species and 6 varieties, while in 1922 Degner (xiii), when dealing with the results of the Michaelsen expedition of 1911, enumerated in a partial list 29 species and 9 varieties.

Since the publication of Boettger's work and independently of those of Degner and other authors, extensive collecting has been carried out by P. Ross Frames, and still more recently by members of the staffs of the South African Museum and Geological Survey of the Union, for the most part aided by financial assistance from the South West African Administration. The results include several species new to science, which have been already published by the late H. C. Burnup and the present writer, and increase most valuably our knowledge of the distribution and variation of many older forms, so that the paper now presented is by far the most comprehensive which it has yet been possible to bring to bear on the subject.

To exemplify the importance of recent exploration, I may mention that no fewer than ten organised expeditions have been undertaken since 1916, as listed below ; with the exception of Dr. S. H. Haughton and Mr. H. F. Frommurze, of the Geological Survey, all the collectors are, or were, members of the staff of the South African Museum.

- 1916. R. W. E. Tucker (with Prof. Pearson ; Percy Sladen Expedition). S. Damaraland, Gibeon to Windhoek.
- 1919. R. M. Lightfoot (S.A.M. Expedition). Grootfontein District.
- 1920. R. W. E. Tucker (S.A.M. Expedition). Grootfontein, Otjiwarongo and Waterberg Districts.
- 1921. K. H. Barnard (Government Research Grant). Tsumeb to Ovamboland, and Otjiwarongo to Narebis.
- 1923. K. H. Barnard and party (Administration of S.W.A. grant). Tsumeb to Ovamboland and the Great Falls of Kunene River.
- 1925. R. F. Lawrence and party (Administration of S.W.A. grant). Outjo to Zesfontein.
- 1925. K. H. Barnard (with Dr. Haughton). Nakob, S.E. corner of Great Namaqualand.
- 1926. K. H. Barnard and party (Administration of S.W.A. grant). Outjo to Kaoko Otavi and Hoarusib River.
- 1926. S. H. Haughton (Geological Survey). Aiais and district between Warmbad and the N. bank of Orange River.
- 1927. S. H. Haughton and H. F. Frommurze (Geological Survey). Erongo Mt. to Brandberg, Franzfontein, and Omaruru River.

The map, Plate IV, shows the revised geographical boundaries and every locality from which specimens have been obtained. A few discrepancies will be noted between the districts to which certain localities are assigned in these pages and in my Reference List, due to the revised subdivisions and to the difficulty of ascertaining exactly the external boundary limits, even so lately as seventeen years ago.

As the Revised Reference List (ix), already published in these Annals, gives every reference of the slightest importance to the species described before its appearance, all that is now necessary is to cite the original description, the No. in my Reference List being sufficient guide to other papers, prior to its completion. Full references are made to all subsequent works on the subject.

The letters D., F., A., R., N., L. denote, as in my List (ix), that the paper contains Description, Figure of shell, Anatomy, Radula, Note or Locality, but the two latter are only given when there is no more important matter in the article.

My warm thanks are due to the late H. C. Burnup and to Dr. E. Warren, of the Natal Museum, Pietermaritzburg, for the loan of much material, including the Ross Frames collection, with permission to incorporate the results of its investigation in the present paper, while, just on the point of going to press, Miss Wilman has kindly furnished me with several important additions to the South African fauna, collected by G. C. Shortridge in the rivers of Ovamboland.

(ii) SYSTEMATIC.

CLASS GASTROPODA.

ORDER PULMONATA.

FAMILY ZONITIDAE.

Subfamily ARIOPHANTINAE.

Genus *Zonitoides* Lehm., 1862.

Zonitoides africanus O. Bttg.

Ref. List No. 184.

1910. *Zonitoides africanus* Bttg., Abh. Senckenb. Ges., xxxii, p. 436, pl. 28, fig. 2. D.F.

Hab. DAMARALAND. Gobabis (subfossil, Hermann).

A smooth, rather widely umbilicate shell, $2\frac{3}{4} \times 5\frac{1}{4}$ mm. in altitude and diameter; the figures show it as strongly striate, in direct contradiction to the description. It is also known in subfossil condition from Bechuanaland.

Subfamily HELICARIONINAE.

Genus *Gymnarion* Pilsb., 1919.*Gymnarion lacrimosus* Conn.

1929. *Gymnarion lacrimosus* Conn., Ann. Natal Mus., vi, p. 224, pl. xiv, figs. 6-9. D.F.R.

Hab. KAOKOVELD. Kaoko Otavi (Barnard).

The south-western limit so far established for this genus, which probably has a wide range in tropical Africa; the shell is unusually solid and is remarkable for its beautiful beaded sculpture, but as H. Watson has found the animal to be purely a *Gymnarion*, I have not created any sectional name on conchological grounds alone.

FAMILY ENDODONTIDAE.

Genus *Sculptaria* Pfr., 1855.

An interesting genus containing beautifully sculptured shells, of which one species (*collaris* Pfr.) from Benguella, and a single unidentified specimen in the Albany Museum from Gordonias, provide the only known representation outside South West Africa. No more than four species had been established before 1922, since when the number has exactly doubled.

Sculptaria collaris (Pfr.).

Ref. List No. 223.

1867. *Helix collaris* Pfr., Mal. Blätt., xiv, p. 197. D.

1909. *Stegodera* (*Moellendorffia*) *mariae* Nobre, Bull. Soc. Portugaise, iii, Supp. 2, p. 79. D.

1923. *Sculptaria collaris* Pfr. (= *mariae* Nobre) Bnp., Ann. Natal Mus., v, p. 84, pl. i, figs. 14-18. D.F.

Described from an unknown locality, but subsequently attributed in Pfeiffer's "Nomenclator" to Damaraland. However, Burnup has proved that all the specimens he has been able to trace were collected in Benguella or further north, and that Pfeiffer's record of Damaraland is almost certainly erroneous.

Sculptaria corona Bnp.

1923. *Sculptaria corona* Bnp., loc. cit., p. 34, pl. ii, figs. 41-45. D.F.

Hab. NAMIB. Swakopmund (Frames).

A prettily sculptured species of the group of *reticulata* Mts., though quite distinct; only two specimens are yet known.

Sculptaria damarensis (H. Ad.).

Ref. List No. 224.

1870. *Helix* (*Corilla*) *damarensis* H. Ad., P.Z.S., p. 379, pl. xxvii, fig. 14. D.F.

1890. *Sculptaria chapmanni* Ancey, Bull. Soc. Mal. Fr., vii, p. 156. D.

1892. *Sculptaria melvilliana* (= *chapmanni* Ancey, non Cox), Ancey, Brit. Nat., p. 126. N.

1920. *Sculptaria damarensis* H. Ad., Gude, Proc. Mal. Soc., xiv, p. 55. N.

1922. *Sculptaria damarensis* H. Ad., Dgnr., L.-u S.-w. fauna D.-Sw. A., Moll., p. 5. N.

1923. *Sculptaria damarensis* H. Ad., Dgnr., Arch. f. Moll.-K., lv, p. 146, pl. vi, figs. 1-10. A.R.

1923. *Sculptaria damarensis* H. Ad., Bnp., Ann. Natal Mus., v, p. 19, pl. i, figs. 19-23. D.F.N.

Hab. DAMARALAND (fide H. Adams; G. de Vylder, 1873); Grootfontein; Tsumeb (Michaelsen); Grootfontein; Gaub; Outjo (Barnard); Otavi Mountain (Durban Light Infantry).

NAMIB. Walfish Bay (*chapmanni*, Andersson and Chapman).

One of the largest of the genus, averaging about 3.64×8.75 mm. in altitude and diameter respectively, one example measured by Burnup being 4.0×9.5 mm.

var. *minor* Degner.

1922. *Sculptaria damarensis* H. Ad., var. *minor* Dgnr., loc. cit., p. 5. D.R.

1923. *Sculptaria damarensis* H. Ad., var. *minor* Dgnr., Bnp., loc. cit., p. 23, pl. i, figs. 24-30. D.F.

Hab. DAMARALAND. Karibib (Michaelsen); Swakop Valley (Frames).

Smaller than the typical form, averaging about 3.0×7.5 mm.; the type was 2.4×6.8 mm.

Sculptaria framesi Bnp.

1923. *Sculptaria framesi* Bnp., loc. cit., p. 41, pl. ii, figs. 62-66. D.F.

Hab. DAMARALAND. Swakop Valley (Frames).

A comparatively small species, averaging about 3.67×6.25 mm., with high spire and weak sculpture.

Sculptaria leschkei Dgnr.1922. *Sculptaria leschkei* Dgnr., loc. cit., p. 7, fig. 2. D.F.

1923. „ „ „ Bnp., loc. cit., p. 25, pl. ii, figs. 57-61. D.F.

Hab. DAMARALAND. Karibib (Michaelsen).

NAMIB. Swakopmund (Frames).

KAOKOVELD. Warmbad *; Kaoko Otavi (Barnard).

Not unlike *S. damarensis*, but easily distinguishable through having a stronger keel at the periphery, and a blunt one on the base which is lacking in the older species. The average size of Degner's set was 2.04×7.44 mm., and of those measured by Burnup 2.68×7.89 , with a maximum of about 2.79×8.15 mm., but the shell sometimes attains greater dimensions, the largest example from Kaoko Otavi being 4.0×9.8 mm. in altitude and major diameter.

Sculptaria pyramidata Bnp.1923. *Sculptaria pyramidata* Bnp., loc. cit., p. 38, pl. ii, figs. 46-56. D.F.*Hab.* DAMARALAND. Usakos (type, Frames).

NAMIB. Swakopmund (Frames).

Another beautiful species of the *retisculpta* group; the average size of the five specimens measured by Burnup was 2.59×4.97 mm.

Sculptaria retisculpta (Mts.).

Ref. List No. 225.

1889. *Helix retisculpta* Mts., Nachr.-Bl. D. Mal. Ges., xxi, p. 154. D.1920. *Sculptaria* „ „ Gude, Proc. Mal. Soc., xiv, p. 55. N.

1923. „ „ „ Bnp., loc. cit., p. 29, pl. i, figs. 31-40. D.F.

Hab. DAMARALAND. Usakos (ex 'Linnaea,' fide von Martens).

NAMIB. Swakopmund (Frames).

A rare and beautiful species, remarkable for its prominent reticulate sculpture.

Sculptaria sculpturata (Gray).

Ref. List No. 226.

1838. *Helicodonta sculpturata* Gray, Alexander's Expedition, ii, p. 268. D.

* The native village of Warmbad in the Kaokoveld is not to be confused with the township and magisterial district of the same name in the south of Great Namaqualand.

1910. *Sculptaria sculpturata* Gray, var. *rinteleni*, Bttg., loc. cit., p. 437, pl. xxviii, fig. 1. D.F.

1920. *Sculptaria sculpturata* Gray, Gude, Proc. Mal. Soc., xiv, p. 55. N.

1922. *Sculptaria sculpturata* Gray, var. *rinteleni* Bttg., Dgnr., loc. cit., p. 6. N.

1923. *Sculptaria sculpturata* Gray (=var. *rinteleni* Bttg.), Bnp., loc. cit., p. 7, pl. i, figs. 1-13. D.F.

Hab. GREAT NAMAQUALAND. About the Great Fish River (Alexander); Bullspoort (Tucker).

DAMARALAND. Usakos (Barnard); Kurikaubmund am Swakop (Kurikop bei Otjikango) (Rintelen); Usakos; Karibib; Khan River (Frames); Huleb, S. of Usakos (var. *rinteleni*, Rintelen); Karibib (var. *rinteleni*, Michaelsen).

NAMIB. Swakopmund (Frames).

Burnup has shown that there is no object in retaining *rinteleni* as a varietal name, since every intermediate can be found between it and the typical form. The species is easily distinguishable from any other yet described, owing to the aperture containing only three plicae, instead of the usual four.

Genus *Trachycystis* Pilsb., 1893.

Trachycystis eupleura Conn.

1925. *Trachycystis eupleura* Conn., A.M.N.H., xv, p. 470, pl. xxviii, fig. 8. D.F.

Hab. GREAT NAMAQUALAND. Bremen Farm, Warmbad District (Haughton).

Originally described from Herschel District, Cape Province, it is surprising to find this species so far afield, but the examples from Bremen are in subfossil condition and may, perhaps, be extinct in that locality; it is a small species, 2.2×4.8 mm. in altitude and diameter, with comparatively open umbilicus and strong costulate sculpture.

FAMILY ACAVIDAE.

Genus *Trigonephrus* Pilsb., 1905.

Trigonephrus gypsinus (M. & P.).

Ref. List No. 290.

1891. *Helix* (*Dorcasia*) *gypsina* M. & P., A.M.N.H., viii, p. 238. D.

1915. *Trigonephrus gypsinus* M. & P., Conn., Ann. S.A. Mus., xiii, p. 147, pl. ii, fig. 3. D.F.A.R.

Hab. NAMIB. 90 km. S. of Lüderitzbucht (in South African Museum).

Described from Little Namaqualand, whence it has been recorded from four localities.

Trigonephrus porphyrostoma (M. & P.).

Ref. List No. 292.

1891. *Helix* (*Dorcasia*) *porphyrostoma* M. & P., A.M.N.H., viii, p. 238. D.

1915. *Trigonephrus porphyrostoma* M. & P., Conn., *loc. cit.*, p. 152, pl. ii, fig. 6; pl. iv, figs. 2, 11, 19, 25, 28; pl. v, fig. 3. D.F.A.R.

Hab. GREAT NAMAQUALAND (?). Lower Orange River (Schenck).

NAMIB. Angra Pequenas (=Lüderitzbucht) (Schneider).

Described from Little Namaqualand, and also known from the Cape Province.

Trigonephrus rosaceus (Müll.).

Text-fig. 1.

Ref. List No. 293.

1774. *Helix rosacea* Müll., Verm., ii, p. 76. D.

1915. *Trigonephrus rosaceus* Müll., Conn., *loc. cit.*, p. 150, pl. ii, figs. 4, 5; pl. iv, figs. 10, 18; pl. v, fig. 2. D.F.A.R.

1926. *Trigonephrus rosaceus* Müll., Wenz, Diam.-Wüste S.-W.-A., ii, p. 155, pl. xxxix, figs. 1-3. N.F.L.

1928. *Trigonephrus rosaceus* Müll., Haas, Senckenbergiana, x, p. 91. N.L.

Hab. NAMIB. Bogenfels Diamond Field (L. J. Spencer); Buntfeldschuh, East Bogenfels (recent); Elfirtstafelberg, Schacht; Vlei S. of Lockuppe Klingharal (=Klinghardt) gebirge; Feld Lübeck, 12 km. S.E. of Lüderitzbucht (subfossil); Neu Gamachabrunnen, 7 km. S.E. of Bogenfels (Kaiser and Beetz); Granitberg, 85 km. S. of Lüderitzbucht (subfossil, Lotz); Kolmanskop near Lüderitzbucht (Braunfels); near Bogenfels (Lotz); S. of the Bushelberg, Lüderitzland, 150 metres (Range); dunes W. of Lüderitzbucht (in Senckenberg Museum).

GREAT NAMAQUALAND. W. of Aurus and S. of Kubub near Aus (Range).

Previous to the records of Wenz and Haas, this species appears to have been known only from the Cape Province, where it is widely distributed along the north-western seaboard.

Haas states that the example from the Busheberg is in live

condition, of a violet-brown colour with a bright malachite-green peristome, and that the subfossil shells from Granitberg merge toward *T. porphyrostoma* (M. & P.). In two of those figured by Wenz the aperture is noticeably less oblique than usual, and Spencer's single example (text-fig. 1) diverges still further in this respect. In fact, although it has the sculpture and rosy aperture of *rosaceus*, it differs from it in so many other respects that it may well represent a distinct species.



TEXT-FIG. 1.

Genus *Dorcasia* Gray, 1838.

Dorcasia alexandri Gray.

Ref. List No. 282.

1838. *Dorcasia alexandri* Gray, Alexander's Expedition, ii, p. 268. D.

1915. „ „ „ Conn., *loc. cit.*, p. 167, pl. iii, fig. 5.

D.F.A.

1922. *Dorcasia alexandri* Gray, Dgnr., *loc. cit.*, p. 8, figs. 3-5. N.A.

1926. *Dorcasia alexandri* Gray, Wenz, *loc. cit.*, p. 156, pl. xxxix, fig. 4. N.F.

1928. *Dorcasia alexandri* Gray, Haas, *loc. cit.*, p. 93. N.L.

Hab. GREAT NAMAQUALAND. About the Great Fish River (Alexander); Aiais, S.W. of Warmbad (Haughton).

DAMARALAND. Usab* (fide von Martens); Kurikaubmund (Rintelen); Okahandja; Neudamm (Michaelson); Windhoek (Thomsen; Barnard); Tsumeb (Barnard); Usakos (Frames); Kuisib Valley near Heusis (Thomsen); Otjiwarongo (in Senckenberg Museum).

Also collected in Little Namaqualand by Lightfoot at Henkries, and in Gordonia at Reimvastmak, Bosman's Pile Hills, and on the Bak River, 8 miles above its junction with the Orange River, by Barnard, in the last two localities in company with the var. *minor*.

A beautiful corneous-brown shell, with rather depressed spire, weak transverse sculpture and extremely strangulate, excentric rima; examples to hand measure from 23-29 mm. in major diameter.

Var. *minor* Bttg.

1886. *Helix* (*Dorcasia*) *alexandri* Gray, var. *minor* Bttg., Ber. Senckenb. Ges., p. 22, pl. ii, fig. 1. D.F.

* Probably the Ugab River.

1915. *Dorcasia alexandri* Gray, var. *minor* Bttg., Conn., *loc. cit.*, p. 169, pl. iii, fig. 6. D.F.

1928. *Dorcasia alexanderi* Gray, var. *minor* Bttg., Haas, *loc. cit.*, p. 93. L.

Hab. GREAT NAMAQUALAND. Geitsi Gubib (Schenck; Rogers); Brukkaros (in Senckenberg Museum).

DAMARALAND. Windhoek (in Natal Museum).

Also known from Gordonia, as recorded above under the typical form, to which it is very similar, but smaller, about 21 mm. in diameter.

Var. *rotundata* Mouss.

1887. *Helix alexandri* Gray, var. *rotundata* Mouss., J. de C., xxxv, p. 292, pl. xii, fig. 1. D.F.

1914. *Dorcasia alexandri* Gray, var. *siegmanni* Honigmann, Nachr.-Bl. D. Mal. Ges., pp. 29, 31. D.F.

1915. *Dorcasia alexandri* Gray, var. *rotundata* Mouss. (= *siegmanni* Honigmann), Conn., *loc. cit.*, p. 169, pl. iii, fig. 7; pl. iv, figs. 6, 16, 24; pl. v, figs. 8, 11. D.F.A.R.

1928. *Dorcasia alexanderi* Gray, aff. var. *rotunda* Mouss., Haas, *loc. cit.*, p. 93, and figs. 1, 2 on p. 92. N.F.

Hab. GREAT NAMAQUALAND. Rehoboth (Schinz); Homeib River, S.W. of Rehoboth (*siegmanni*, Siegmann); Heliographenberg near Rehoboth; Tsumis (subfossil, Lotz).

Rather a small form, 18 to 24 mm., similar to the type and var. *minor* about the umbilical region, but with rather stronger, though equally close, sculpture and a more exserted spire. The subfossil series from Tsumis is quite inseparable from recent examples.

Var. *trivia* Bttg.

1910. *Helix (Dorcasia) alexanderi* Gray, var. *trivia* Bttg., Abh. Senckenb. Ges., xxxii, p. 439, pl. xxviii, fig. 3. D.F.

1915. *Dorcasia alexandri* Gray, var. *trivia* Bttg., Conn., *loc. cit.*, p. 171. D.

Hab. DAMARALAND. Kamas Highlands (Schultze).

A large form, 24 to 30 mm. in major diameter, agreeing with the type in the narrow umbilicus, but differing from all the foregoing in its sculpture, which consists of strong curved transverse costae, much more widely spaced than in the smoother forms.

Var. *perspectiva* Conn.

1915. *Dorcasia alexandri* Gray, var. *perspectiva* Conn., *loc. cit.*, p. 172, pl. iii, fig. 8. D.F.

1929. *Dorcasia alexandri* Gray, var. *perspectiva* Conn., Adens., Ann. Naturh. Mus. Wien, xliii, p. 390. N.

Hab. DAMARALAND. Omaruru River (Wohlfahrt); Nobgams and Neineis, Omaruru River; Uis, near Brandberg (Haughton); Okambahe (Lebzelter).

Specimens I have measured range between 22 and 25 mm., while the largest in Adensamer's series from Okambahe were 27.5 and 29 mm.; the costulate sculpture is the same as in *trivia*, but the umbilicus is an open circle, without strangulation.

Var. *montana* Conn.

1916. *Dorcasia alexandri* Gray, var. *montana* Conn., Ann. S.A. Mus., xiii, p. 179. D.F.

1928. *Dorcasia alexandri* Gray, var. *montana* Conn., Haas, *loc. cit.*, p. 93 and figs. 3, 4 on p. 92. N.F.L.

Hab. DAMARALAND. Mt. Usakos (Frames); Erongo Mts. (Rogers).

GREAT NAMAQUALAND. Bullspoort (Tucker); Naauwkloof, and on the mountains between there and the Namib border (ex Rolle, in Senckenberg Museum).

Similar to *perspectiva* in its wide umbilicus, but with the smooth striation of the typical form; diameter varies from 20 to 31 mm.

Var. *glabra* Adens.

1929. *Dorcasia alexandri* Gray, var. *glabra* Adens., *loc. cit.*, p. 388, pl. xii, fig. 2; pl. xiii, figs. 3, 4. D.F.

Hab. DAMARALAND. Okambahe (Lebzelter).

11 examples, ranging from 27.0 to 35.9 mm. in major diameter; the author differentiates it from var. *montana* Conn. by reason of its still weaker sculpture and wider umbilicus, but both these differences are so extremely slight that they scarcely justify varietal separation.

Dorcasia cernua (Mts.).

(Pl. III, figs. 2-4.)

Ref. List No. 284.

1889. *Helix cernua* Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 161. D.

1915. *Dorcasia cernua* Mts., Conn., Ann. S.A. Mus., xiii, p. 166, pl. iii, fig. 4. D.F.

1926. *Dorcasia cernua* Mts., Wenz, *loc. cit.*, p. 156, pl. xxxix, fig. 6. N.F.

1928. *Dorcasia cernua* Mts., Haas, *loc. cit.*, p. 93. L.

Hab. GREAT NAMAQUALAND. Anganthal and Rooiberg, near Bethany (Schenck); Kuibis (Schultze); Kwab's and Viols Drift, N. of Orange River, Warmbad District (Haughton); Witputz (Range); Duwisit, 170 miles S.W. of Windhoek (C. Murman).

NAMIB. Lüderitzbucht (in Senckenberg Museum).

In fresh condition the shell differs from that of *alexandri* in coloration, being mottled fawn and cream; the umbilicus is wide open and the diameter varies from $15\frac{1}{2}$ to $30\frac{1}{2}$ mm. In its typical form it has an almost flat spire, examples from Viols Drift measuring $25 \times 19\frac{1}{2} \times 12$ and $19\frac{1}{2} \times 16 \times 11\frac{1}{2}$, and from Kwab's Drift, $21\frac{1}{2} \times 16\frac{1}{2} \times 11$ mm. in major and minor diameter and altitude respectively, but many of the series from Duwisit are comparatively much higher in the spire, though very variable in this respect, as evinced from the subjoined data:

	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Diam. major	23	$22\frac{1}{2}$	$21\frac{1}{2}$	21	21	20	$19\frac{1}{2}$	$17\frac{1}{2}$	$16\frac{1}{2}$	$16\frac{1}{2}$	$15\frac{1}{2}$
„ minor	19	19	18	17	$17\frac{1}{2}$	17	16	$14\frac{1}{2}$	$13\frac{1}{2}$	13	13
Altitude	13	15	$12\frac{1}{2}$	$13\frac{1}{2}$	$11\frac{1}{2}$	12	$13\frac{1}{2}$	$11\frac{1}{2}$	$11\frac{1}{2}$	$10\frac{1}{2}$	9

Dorcasia coagulium (Mts.).

Ref. List No. 288.

1889. *Helix coagulium* Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 160. D.

1915. *Dorcasia coagulium* Mts., Conn., *loc. cit.*, p. 162, pl. iii, fig. 1; pl. iv, figs. 5, 14, 22, 26, 30; pl. v, fig. 6. D.F.A.R.

Hab. GREAT NAMAQUALAND. On the road from Aos to the Orange River, and near the Lower Orange River (Schenck).

Also recorded from Stinkfontein and Fielding's Chabeesies in Little Namaqualand (Rogers).

A rare species of similar colour pattern to the foregoing, but of more globose form, with narrow strangulate umbilicus.

Dorcasia rogersi Conn.

Forma *maxima*.

1915. *Dorcasia rogersi* Conn., *loc. cit.*, p. 164, pl. iii, fig. 3. D.F.

Hab. GREAT NAMAQUALAND. Aiais and Klipneus, north bank of Orange River, Warmbad District (Haughton).

This species differs from *cernua* mainly in having a narrow, rather strangulate umbilicus; it varies much in size, the type, which was selected because its anatomy was available, being only 20 mm. in diameter, while a forma *major* measures about 26 and the forma *maxima* 30 mm., an example from Klipneus reaching 33.5 mm. This large form is the only one yet collected in S.W.A., the small typical race hailing from t'Kaigas and the forma *major* from Henkries, both in Little Namaqualand.

The last three species differ clearly from the *alexandri* group in that the ends of their peristome do not meet, whereas in *alexandri* the peristome is continuous.

Dorcasia kaiseri Wenz.

1926. *Dorcasia kaiseri* Wenz, *loc. cit.*, p. 156, pl. xxxix, fig. 5. D.F.

Hab. NAMIB. Neu Gamachabbrunnen, 7 km. S.E. of Bogenfels (fossil, Kaiser and Beetz).

A rather widely umbilicate fossil, compared by its author to both *alexandri* and *cernua*.

Dorcasia antiqua Wenz.

1926. *Dorcasia antiqua* Wenz, *loc. cit.*, p. 157, pl. xxxix, fig. 7. D.F.

Hab. NAMIB. Chalcedontafelberg, west of the old Lüderitz fields (Eocene, Kaiser and Beetz).

Wenz states that *antiqua* is simpler and older than *kaiseri*; it comes nearest to *cernua*.

FAMILY PACHNODIDAE.

Genus *Conulinus* Mts., 1895.

Conulinus kaokoensis Conn.

1929. *Conulinus kaokoensis* Conn., Ann. Natal Mus., vi, p. 231, pl. xiv, fig. 24. D.F.

Hab. KAKOVELD. Kaoko Otavi; Hoarusib River, W. of Kaoko Otavi; Otjinjerese (Barnard).

A remarkable addition to this fauna, which has not yet occurred in live condition; it recalls some of the Natal species, such as *maritzburgensis* M. and P., but is amply distinct from any of them.

Genus *Rachis* Albers, 1850.

Rachis punctata (Anton).

Ref. List No. 327.

1839. *Bulimus punctatus* Ant., Verz. Conch. Samml., p. 42. D.

1898. *Buliminus (Rhachis) punctatus* Ant. (= *ferussaci* Dkr.) Stur., Denkschr. K. Akad. Wiss. Wien, lxxvii, p. 600. L.

1925. *Rhachis punctata* Ant. (= *ferussaci* Dkr.) Conn., Trans. R. Soc. S.A., xii, p. 160, pl. iv, fig. 22. D.F.

Hab. OVAMBOLAND. Upingtonia *; Epitonna (fide Sturany).

DAMARALAND. Omaruru (fide Sturany).

This Indian species is known from the East coast of Africa and also from Loanda, in Portuguese West Africa, but it is more probable that Sturany's records are based on bleached immature examples of *Xerocerastus* than that *punctata* exists in South West Africa.

FAMILY PUPILLIDAE.

Genus *Pupoides* Pfr., 1854.

(= *Leucochiloides* Pfr., 1881.)

Pupoides minusculus (Mouss.).

Ref. List No. 336.

1887. *Buliminus (Leucochiloides) minusculus* Mouss., J. de C., xxxv, p. 295, pl. xii, fig. 5. D.F.

1921. *Pupoides minusculus* Mouss., Pilsb., Manual, xxvi, p. 139, pl. xiv, fig. 5. D.F.

1922. *Leucochiloides minusculus* Mouss., Dgnr., loc. cit., p. 31. N.

Hab. OVAMBOLAND. Ku-Ganab, S.E. of Ondonga (Schinz); Hoeis (Hermann); Sodanna (Passarge); Onolongo; Ukualuthi (Barnard).

DAMARALAND. Sandup (Barnard).

Also recorded by von Martens from Meno a kwen, Bechuanaland (subfossil, Passarge).

Mousson gives 3 mm. as the length of the single shell on which he founded his species, while examples from Sandup measure 3.6 mm. If there is any true specific difference between it and *calaharicus* and the others of this group, it may lie in the fact that *minusculus*, the

* Upingtonia was the name given, in honour of Sir Thomas Upington, in 1885 to a stretch of country situated roughly between the Etosha Pan and Omaruru. The name never had any real political or geographical significance, and is no longer in use.

smaller form, seems to be restricted to the northern districts of South West Africa in recent condition, not having occurred further south than latitude 19°, whereas *calaharicus* and its allies have a wide distribution over most of the Dark Continent.

Var. *major* Dgnr.

1922. *Leucochiloides minusculus* Mouss., var. *major* Dgnr., loc. cit., p. 31. D.

1926. *Pupoides minusculus* Mouss., var. *major* Dgnr., Pilsb., Manual, xxvii, p. 252. N.

Hab. DAMARALAND. Tsumeb; Grootfontein; Otavifontein; Okahandja; Karibib; Okapuka (Michaelsen); Usakos; Outjo; Caugas Okawa (Barnard).

KAOKOVELD. Kaoko Otavi (Barnard).

According to Degner, *minusculus*, cum var. *major*, can be distinguished from *calaharicus* through having flatter whorls, shallower suture and comparatively larger aperture, two-fifths of the total length instead of barely one-third; var. *major*, however, is certainly extremely near akin to *calaharicus*, and I doubt if any constant difference exists between them.

Pupoides calaharicus (Bttg.).

Ref. List No. 335.

1886. *Buliminus (Leucochiloides) calaharicus* Bttg., Ber. Senckenb. Ges., p. 24, pl. ii, fig. 3. D.F.

1921. *Pupoides calaharicus* Bttg., Pilsb., Manual, xxvi, p. 138, pl. xiv, figs. 10, 11; pl. xvii, fig. 8. D.F.

Hab. DAMARALAND (Geale); Karibib; Usakos (Frames); Outjo (Lawrence); Nuragas (Lightfoot); Namutoni; Narebis (Barnard).

GREAT NAMAQUALAND. Nakob (Barnard); Bullspoort (Tucker); Kuibis (Michaelsen); Homeib River, near Klip (Siegmann).

Described from Ghous, Gordonias (Nolte) and extending through Griqualand West and the Cape Province to Rhodesia and Zululand, but the exact relationship has not yet been determined between the Indian *coenopictus* Hutt., the African *senegalensis* Morel., *sennaariensis* Pfr., *soror* Preston and the present species; such points of difference as may exist are hardly discernible and intermediate forms are found. While normally about 5 mm. in length, *calaharicus* occasionally, though rarely, attains far greater dimensions, one of the largest shells I have seen, from the Noap Hills, Gordonias, being as much as 7.6 mm. long.

Genus *Microstele* Bttg., 1886.

Microstele noltei (Bttg.).

Ref. List Nos. 337 and 338.

1886. *Pupa* (*Microstele*) *noltei* Bttg., Ber. Senckenb. Ges., p. 25, pl. ii, fig. 4. D.F.

1910. *Leucochiloides* (*Microstele*) *oblongus* Bttg., Abh. Senckenb. Ges., xxxii, p. 445, pl. xxviii, fig. 11. D.F.

1921. *Microstele noltei* Bttg., Pilsb., Manual, xxvi, p. 150, pl. xiv, figs. 12-16. D.F.

1921. *Microstele oblongus* Bttg., Pilsb., Manual, xxvi, p. 149, pl. xiv, fig. 17. D.F.

1922. *Leucochiloides* (*Microstele*) *noltei* (= *oblongus*) Bttg., Dgner., loc. cit., pp. 33, 34, fig. 11. N.F.

1926. *Microstele noltei* Bttg., Pilsb., Manual, xxvii, p. 253. N.

Hab. DAMARALAND. 140 km. from Swakopmund (*oblongus*, Rintelen); Omaruru (Michaelsen); Usakos; Outjo; Caus Okawa (Barnard).

GREAT NAMAQUALAND. Homeib River, near Klip (Siegmann).

KAOKOVELD. Zesfontein (Lawrence).

Noltei was described from Ghous, Gordonia (Nolte), and has been collected by Barnard at Aries and in the Noap Hills. I agree with Degner that *oblongus* is a synonym; in a series of 18 shells from Klip, which I examined in 1914, the largest, $3\frac{3}{4} \times 1\frac{1}{2}$ mm., contained 6 whorls and matched almost exactly Böttger's figure and description of *noltei*, while another, $3\frac{1}{2} \times 1\frac{1}{4}$ mm., was more conical and less cylindrical, coming very near to his figure of *oblongus*, having more convex whorls and consequently deeper suture. All these specimens possessed the 2 internal teeth of *noltei*, but these were often extremely small, and it would be easy to overlook them.

The series collected by Barnard in the northern districts are characterised by more convex whorls than are usually found in southern examples, but all agree in dentition and do not appear to be variably separable.

Genus *Pupilla* Leach, 1828.

Pupilla fontana (Krs.).

Ref. List No. 347.

1841. *Pupa fontana* Krs., Küst., Conch. Cab., p. 122, pl. xvi, figs. 9-12. D.F.

1908. *Pupa fontana* Krs. (= *elizabethensis*, *charybdis*, *custodita*, *frustillum*, *keroea*, *omicronaria*, *amphodon* and *endoplax* M. and P.), M. and P., A.M.N.H., i, p. 74. N.

1921. *Pupilla* (*Primipupilla*) *fontana* Krs. (= *raffrayi* Bgt. and *globulosa* Jick.), Pilsb., Manual, xxvi, p. 207, pl. xvi, figs. 1-23. D.F.

1922. *Pupilla fontana* Krs. (= *Ennea iredalei* Prest.), Conn., A.M.N.H., x, p. 497. N.

1927. *Pupilla fontana* Krs., Pilsb., Manual, xxvii, p. 255. N.

Hab. DAMARALAND. Gobabis (subfossil, Hermann).

Described from the Transvaal and widely distributed in live condition over nearly the whole of South Africa, while it also appears to extend to Kenya Colony and Abyssinia.

Pupilla tetrodus (Bttg.).

Ref. List No. 356.

1870. *Pupa tetrodus* Bttg., Ber. Offenbach. Ver. f. Naturk., xi, p. 46, pl. i, fig. 1. D.F.

1880. *Pupa* (*Vertigo*) *sinistrorsa* Crvn., P.Z.S., p. 618, pl. lvii, fig. 8. D.F.

1891. *Pupa thaumasta* M. and P., A.M.N.H., viii, p. 239. D.

1910. *Pupilla tetrodus* (= *sinistrorsa* and *thaumasta*) Bttg., Abh. Senckenb. Ges., xxxii, p. 446. N.

1921. *Pupilla* (*Afripupilla*) *tetrodus* Bttg., Pilsb., Manual, xxvi, p. 216, pl. xvii, figs. 9, 10, 14-16. D.F.

Hab. OVAMBOLAND. Disappointment Vlei (*thaumasta*, in coll. Layard).

DAMARALAND. Outjo; Narebis; Nuragas; Usakos (Barnard).

KAOKOVELD. Ombombo; Kaoko Otavi; subfossil at Kamanyab (Barnard).

A sinistral species, also known from Bechuanaland, British Bechuanaland, Cape Province, Orange Free State and the Transvaal.

Genus *Gastrocopta* Wollaston, 1878.

Gastrocopta damarica (Ancey).

Ref. List No. 344.

1888. *Pupa damarica* Ancey, Le Naturaliste, x, p. 200. D.

1892. *Pupa ovampoensis* M. and P., A.M.N.H., ix, p. 91, pl. vi, fig. 11. D.F.

1894. *Pupa microbus* Morel., Dautz., Bull. Soc. Zool. Fr., xix, p. 129, pl. i, fig. 5. D.F.

1901. *Pupa ridibunda* M. and P., A.M.N.H., vii, p. 320, pl. ii, fig. 11. D.F.

1917. *Gastrocopta damarica* Ancey, Pilsb., Manual, xxiv, p. 125, pl. xxii, figs. 14-16. D.F.

1918. *Gastrocopta damarica* Ancey, Pilsb., Manual, xxiv, p. 359, pl. xlvi, fig. 12. N.F.

1925. *Gastrocopta damarica* Ancey (= *microbus* Morel.), Conn., A.M.N.H., xv, p. 479. N.

1926. *Gastrocopta microbus* Morel., Dautz., Pilsb., Manual, xxvii, p. 209. N.

Hab. OVAMBOLAND (*ovampoensis*, in coll. Layard); Disappointment Vlei (*damarica*, Andersson and Chapman).

DAMARALAND. Outjo; Narebis; Nuragas; Usakos (Barnard).

KAOKOVELD. Kaoko Otavi (Barnard).

Also recorded from the Cape Province, Transvaal, Orange Free State, Zululand, Rhodesia, and Senegal.

Genus *Nesopupa* Pilsb., 1900.

Nesopupa sp.

Hab. DAMARALAND. Cauas Okawa (Barnard).

KAOKOVELD. Ombombo; Kaoko Otavi (Barnard).

A few calcined shells, doubtless attributable to this genus, were collected in the foregoing localities, but in all cases the aperture was choked with soil and the condition too fragile to run the risk of cleaning.

FAMILY ACHATINIDAE.

Genus *Achatina* Lam., 1799.

Achatina damarensis Pfr.

Ref. List No. 375.

1870. *Achatina dammarensis* Pfr., Mal. Blätt., xvii, p. 31. D.

1870. *Achatina dammarensis* Pfr., Novit. Conch., iv, p. 2, pl. cix, figs. 3, 4. D.F.

1922. *Achatina damarensis* Pfr., Dgnr., loc. cit., pp. 34, 36, fig. 12; p. 37, fig. 13. N.A.R.

1929. *Achatina damarensis* Pfr., Adens., loc. cit., p. 397. N.L.

Hab. DAMARALAND (coll. Dohrn); Ubeb on the Khan River (Schenck); Omuramba-Omataka R., near Okosongoho; bank of the Black Nosab, near Gobabis (Hermann); Grootfontein; Omaruru; Farm Voigtsland, 26 km. E. of Windhoek (Michaelsen); Okosongo-

mingo, on the Little Waterberg (Thomsen); Okahandja (Fock); Sandfontein, E. of Windhoek (Drury); Nobgams; Omaruru R. (Haughton); Okambahe (Lebzelter).

GREAT NAMAQUALAND. Choarib; Choa's District (Hermann); Homeib R., near Klip (Siegmann).

KAOKOVELD. Kaoko Otavi (Barnard).

Also recorded from Bechuanaland.

The type is of almost uniform yellow, with a few irregular flames of slightly deeper shade; it is only 45×24 mm., apert. 26×14 mm. in length and breadth; but the species appears to attain considerably greater dimensions and it is possible that the two which follow merely represent better grown, dark-flamed examples of Pfeiffer's species, with which they agree fairly well in contour and sculpture. The shells collected by the South African Museum are in bleached condition, but agree in other respects with *damarensis*.

Achatina schinziana Mouss.

Ref. List No. 397.

1887. *Achatina schinziana* Mouss., J. de C., xxxv, p. 294, pl. xii, fig. 3. D.F.

Hab. OVAMBOLAND. Ondongua (Schinz); Sodanna (Passarge); upper reaches of Omuramba-Omatoka R. (Shortridge).

I have pointed out elsewhere that the record of this species from Lorenzo Marques is incorrect, but Boettger described a var. *degenerata* from Kakir, Bechuanaland.

Achatina passargei Mts.

Ref. List No. 391.

1900. *Achatina passargei* Mts., Sitz.-Ber. Ges. Nat. Fr., Berlin, p. 119. D.

1904. *Achatina passargei* Mts., Die Kalahari, pp. 754, 755, fig. 1. D.F.

Hab. OVAMBOLAND. Sodanna (Passarge).

Appears from the figure to be absolutely identical with *schinziana*.

Achatina tracheia Conn.

1929. *Achatina tracheia* Conn., Ann. Natal Mus., vi, p. 233, pl. xiv, fig. 26. D.F.

Hab. KAOKOVELD. Kaoko Otavi; Hoarusib River (Barnard).

Easily distinguishable through its strong longitudinal sculpture, which renders the shell rough to the touch.

NOTE.—The four genera which now follow may possibly belong to three different families or subfamilies (Stenogyrinae, Ferussaciinae, and Zootecinae), but their exact status is at present so uncertain that, in order to avoid future complications, I include them all, in the present treatise, in the Family Achatinidae, *sensu lato*.

Genus *Opeas* Albers, 1850.

Opeas sublineare Bttg.

Ref. List No. 433.

1910. *Opeas sublinearis* Bttg., *loc. cit.*, p. 448, pl. xxviii, fig. 14. D.F.

Hab. GREAT NAMAQUALAND. Bremen Farm, S.W. of Warmbad (Haughton).

A rare species, described from Little Namaqualand and also known from Griqualand West.

Genus *Subulina* Beck, 1837.

Subulina vitrea (Mouss.).

Ref. List No. 426.

1887. *Stenogyra* (*Subulina*) *vitrea* Mouss., J. de C., xxxv, p. 296, pl. xii, fig. 6. D.F.

1892. *Stenogyra chapmani* M. and P., A.M.N.H., ix, p. 90, pl. vi, fig. 3. D.F.

1922. *Subulina vitrea* Mouss., Dgnr., *loc. cit.*, pp. 38, 39, fig. 14a. D.N.F.

Hab. OVAMBOLAND (*chapmani*, Chapman); Ku-Ganab, S.E. of Ondongua (*vitrea*, Schinz).

KAOKOVELD. Near Otjitundua; Hoarusib River (Barnard).

DAMARALAND. Otavi Mountain (Frames); Tsumeb; Otjikoto Lake; Brakwater, 20 km. N. of Windhoek; Okahandja (Michaelsen); Onguati (Thomsen); Outjo; Namutoni; Sandup; Cauas Okawa (Barnard).

This very slender little species, whose greatest length is about 11 mm., appears to be confined to the northern districts of S.W. Africa; it has not been recorded from elsewhere.

Genus *Ceciloides* Fér., 1807.

Ceciloides acicula (Müll.).

Ref. List No. 408.

1774. *Buccinum acicula* Müll., Verm., ii, p. 150. D.

Hab. DAMARALAND. Outjo ; Namutoni ; Cauas Okawa (Barnard).

KAOKOVELD. Ombombo ; Kaoko Otavi (Barnard).

OVAMBOLAND. Ukualuthi (Barnard).

I am unable to separate specimens from the foregoing localities from the European species, which appears to be rather widely diffused over South Africa.

Ceciloides advena (Ancey).

Ref. List No. 409.

1888. *Caecilionella advena* Ancey, Le Naturaliste, x, p. 215. D.

1892. *Cionella ovampoensis* M. and P., A.M.N.H., ix, p. 91, pl. vi, fig. 1. D.F.

Hab. OVAMBOLAND (*ovampoensis*, in coll. Layard) ; Disappointment Vlei (*advena*, Andersson and Chapman).

There can be no doubt as to *advena* and *ovampoensis* being identical ; both were described from the same original lot ; the type of *advena* is lost, but Ancey mentions in his description a distinct internal angulate thickening on the middle of the paries, which is prominent in the type of *ovampoensis*. Watson has explained this feature in a more intelligible way by stating that young examples of *C. acicula* have a prominent spiral fold on the upper part of the columella, which disappears when the snail is half-grown, but persists until a later stage in one or two continental forms of the genus ; the examples of *ovampoensis* examined by me appear to be quite mature, and to differ in this single respect of the columella fold from all other shells of *Ceciloides* that I have seen from South Africa, otherwise it would certainly agree with them.

The illuminating definition of the locality published by Ancey is as follows :

“ Disappointment Key [*sic*], Ovampoland (‘ Lüderitzland ’ seu ‘ Damara ’). Leg. Cl. Andersson and Chapman,” perhaps the best spot in which to leave this dubious species.

Genus *Xerocerastus* Kob. and Mlldff., 1902

(= *Eburnea* Mouss., 1887, non Fleming, 1828).

There is no doubt that this genus, which was until recently placed in the Enidae, is extremely closely allied to the Stenogyroid *Zootecus*,

even if the two are not congeneric. However, the distribution of the former is limited to the more or less desert regions of S. and S.W. Africa, while *Zootecus* ranges from N.E. Africa to India and the Mascarene Islands, so I retain *Xerocerastus* as distinct until the comparative anatomy has been fully investigated.

As the most difficult questions in this paper have arisen regarding the inter-relationships of the *burchelli-damarensis* group and the equally complicated *subteres* group, I deal first with well stabilised species, which hardly enter into later calculation.

Xerocerastus namibicus (Bttg.).

(Pl. III, fig. 19.)

Ref. List No. 453.

1910. *Ena (Eburnea) namibica* Bttg., Abh. Senckenb. Ges., xxxii, p. 444, pl. xxviii, fig. 10. D.F.

1922. *Ena (Eburnea) namibica* Bttg., Dgnr., loc. cit., p. 30. N.

Hab. DAMARALAND. 140 km. inland from Swakopmund (Rintelen); Karibib (Michaelsen); Usakos (Barnard; Frames).

The smallest and most slender member of the genus; my largest adult example from Usakos is roughly $9\frac{1}{2} \times 3$ mm. in length and breadth, while Degner's Karibib series were 9×3 to $3\frac{1}{4}$ mm.

Xerocerastus eulimoides (Gray).

(Pl. III, fig. 18.)

Ref. List No. 452.

1838. *Bulimus eulimoide* Gray, Alexander's Expedition, ii, p. 269. D.

Hab. GREAT NAMAQUALAND. About the Great Fish River (Alexander); Bullspoort (Tucker).

DAMARALAND. Usakos (Frames).

Another small and slender form, more obese than *namibicus*, measuring about 9×4 mm. In my reference list I placed these two species in *Zootecus*, but for the reasons stated above, I now restore them to *Xerocerastus*.

Xerocerastus hottentotus (Gray).

(Pl. III, fig. 17.)

Ref. List No. 313.

1838. *Bulimus hottentota* Gray, loc. cit., p. 269. D.

1870. *Bulimulus pygmaeus* H. Ad., P.Z.S., p. 9, pl. i, fig. 18. D.F.

1922. *Ena (Eburnea) hottentota* Gray, Dgnr., loc. cit., pp. 26, 27, fig. 9. N.F.

1929. *Ena (Eburnea) hottentota* Gray, Adens., loc. cit., p. 396. N.L.
Hab. GREAT NAMAQUALAND. About the Great Fish River (Alexander); Kuibis (Michaelsen).

OVAMBOLAND (Chapman, fide Layard).

DAMARALAND (*pygmaeus*, coll. Adams); Flats by the Khan River, N. of Tsoachaul (Schenck); Usab (fide Mts.); 140 km. inland from Swakopmund (Rintelen); Otavifontein (Michaelsen); Usakos (Frames; Barnard); Uis; Neineis (Haughton); between Klein Ameib and Usakos (Lebzelter).

By far the stoutest member of the genus, in comparison with its short stature, and easily distinguishable; it varies slightly in diameter, the largest example to hand measuring 12×8 mm.

Xerocerastus robustus (Dgnr.).

(Pl. III, figs. 5, 11.)

1922. *Ena (Eburnea) robusta* Dgnr., loc. cit., pp. 25, 26, fig. 8. D.F.

Hab. DAMARALAND. Otavifontein, 5 km. E. of Otavi (Michaelsen); Otjiwarongo (Barnard); Otavi Mountain (Durban Light Infantry).

Far more obesely conical, in proportion to its length, than any of the species that follow. The type set of four, of which the largest measured 19×10 and the smallest 14×8.5 mm., average 17×9.25 mm. in length and breadth; according to the description there is a small swelling half-way up the columella and the aperture is very angular. The other two sets cited above do not show these features, but they resemble *robustus* in general form and occur, the one within 5 and the other within 60 miles of the type locality, so that there is every reason to consider them conspecific. The set of three from Otavi Mountain measure 20.2×10.3 , 20×9.5 , and 18.5×9.5 mm., while those from Otjiwarongo are smaller and comparatively more narrow, ranging from 16×7.5 down to 14×6.5 , with an average of 15.3×7 mm.

We now come to two groups, in each of which it is difficult to distinguish between the members. The first is that of *burchelli* Gray and *damarensis* H. Ad., with its var. *minor* Pfr., of which the exact relationship can only be determined when the anatomy of the former has been examined. The shell of *burchelli* appears to be translucent flesh pink in freshest condition, but to become white and more or less opaque, with or without rufous streaks, after exposure to a very small degree of weathering. The same is probably the case with *damarensis*,

but I have not observed a record of its occurrence in absolutely fresh condition. The shells of both these species are most variable, within certain well-defined limits, in size and contour, and can be graded into each other. However, it is possible that there may be geographical grounds to assist in their demarcation, and it is principally this that I propose for consideration hereunder.

Xerocerastus damarensis (H. Ad.).

(Pl. III, figs. 1, 6-8.)

Ref. List Nos. 309, 323.

1870. *Bulimus damarensis* H. Ad., P.Z.S., p. 9, pl. i, fig. 17. D.F.

1922. *Ena (Eburnea) damarensis* H. Ad., Dgnr., loc. cit., p. 19. N.

1929. „ „ „ „ Adens., loc. cit., p. 393,
pl. xii, fig. 1. N.F.

1929. *Xerocerastus damarensis* H. Ad., forma *maxima* Conn., Ann.
Natal Mus., vi, p. 236, pl. xiv, fig. 29. D.F.

Var. *minor* Pfr.

(Pl. III, figs. 9, 10.)

1870. *Bulimus damarensis*, var. *minor* Pfr., Mal. Blätt., xvii,
p. 94. D.

1887. *Buliminus (Eburnea) damarensis* H. Ad., var. *expectata*
Mouss., J. de C., xxxv, p. 295, pl. xii, fig. 4. N.F.

1887. *Helix (Cochlicella) opposita* Mouss., *ibid.*, p. 293, pl. xii, fig. 2.
D.F.

1922. *Ena (Eburnea) damarensis* H. Ad., var. *minor* Pfr., Dgnr., loc.
cit., pp. 21, 23, fig. 6. N.R.

1923. *Xerocerastus damarensis* H. Ad., var. *minor* Pfr., Dgnr., Arch.
f. Moll.-K., p. 214, pl. viii, figs. 1-5. A.R.

1928. *Xerocerastus damarensis* H. Ad., var. *minor* Pfr., Haas, loc.
cit., p. 93. N.L.

There may be said to be four races attributable to this species, differing from one another in average dimensions and inhabiting, to a great extent, limited areas from which the others are absent. They appear to lie about the territory in little localised groups, often within a radius of under 30 miles of each other, yet over 200 miles from the other nearest groups of similar dimensions. Further exploration may doubtless extend and possibly confuse the limits of distribution here given, but at present they are very clearly defined.

They may be classed as—

- (i) *Forma typica*.
- (ii) „ *maxima*.
- (iii) „ *minusecula*.
- (iv) „ *minor*.

In order to make some attempt at the elucidation of this and other species which follow, I append the numbers examined and the average dimensions from each separate locality :

(i) *Forma typica*.

DAMARALAND (type, 21×8 mm.); Usakos (Thomsen; Frames; Barnard; 33 shells, ranging from 22×9.4 to 18×7 mm., average 20.2×8.3 mm.); Onguati (Thomsen; 1 shell, 21.5×10 mm.); Uis (Haughton; 5 shells, 20.5×8.2 to 18×7.1 , average 19×7.8 mm.); Neineis (Haughton; 6 shells, 19×7.2 and 18.6×7.6 to 17.5×7 , average 18.4×7.2 mm.); Okambahe, Omaruru River (Haughton; 2 shells, each 18×7.5 mm.; Lebzelter; over 100 shells, ranging from 24.3×10.1 and 22.2×10.0 to 17×8.7 , average 21.1×9.3 mm.); between Klein-Ameib and Usakos (3 shells, Lebzelter).

The five foregoing localities all fall within a comparatively small circle.

Namutoni (Barnard; 28 shells, 21×8.25 to 16×6.5 , average 17×7.1 mm.); Otjikoto (Barnard; 7 shells, 20.25×7.5 to 17.5×7 , average 19×6.85 mm.).

These two localities, though less than 30 miles apart, are 200 miles distant from the Usakos circle.

(ii) *Forma maxima*.

DAMARALAND. Outjo (Barnard; 22 shells, 26×11 to 21×9.5 , average 23.3×10 mm.).

(iii) *Forma minusecula*, a rather small, narrow form.

KAOKOVELD. Otjikondo (Barnard; 38 shells, 17×6.5 to 14×6.5 , average 15.5×6.1 mm.); North of Kowares (Barnard; 7 shells, 16.8×6.7 to 14×6 , average 15.7×6.1 mm.); Kamanyab (Barnard; 7 shells, 18×7 to 16×6.5 , average 16.6×6.8 mm.); between Kamanyab and Choabendus (Barnard; 9 shells, 16.5×6.75 to 13×6 , average 15.4×6.3 mm.); Ombombo (Barnard; 16 shells, 20×7 to 13×5.5 , average 16.7×6.5 mm.).

Whereas the large form from Outjo inhabits the open plains, the narrow forms of group (iii) and the var. *minor* are found to the north-

west of a line half-way between Outjo and Otjikondo, on rocky hills and krantzies, wherever the dolomite crops out; they avoid pure sand, granite, etc.

(iv) Var. *minor*, Pfr. (= *expectata* and *opposita* Mouss.), including a series from Karibib, which are rather large for this variety.

DAMARALAND (type, fide Pfeiffer, $14 \times$ nearly 6 mm.; Geale; 3 shells, 15×5.9 to 13.7×5.6 , average 14.5×5.8 mm.); Karibib (Michaelsen; Frames; 18 shells, 17.3×7.3 to 13.1×6.5 and 13.5×6.3 , average 15.3×7 mm.); Voigtlands Farm, 26 km. E. of Windhoek (Michaelsen; 3 shells, 13.2×5.5 to 11.4×5.5 , average 12.2×5.5 mm.); Usakos (Frames; 12 shells, 17.5×8 to 13.6×6 mm., average 15.8×6.8 mm.).

Usakos and Karibib are about 100 miles from Windhoek.

GROOTFONTEIN (Michaelsen; 1 shell, 13.7×6.6 mm.); between Nuragas and Otjituo (Lightfoot; 39 shells, 13.75×5.5 to 10×4.5 , average 11.9×5.1 mm.).

These three localities form a circle with a radius of 20 miles.

OVAMBOLAND. Upingtonia (Schinz); Onolongo (Barnard; 19 shells, 13×5.5 to 11×4.75 , average 12×5.1 mm.).

KAOKOVELD. Between Otjitundua and Ombombo (Barnard; 16 shells, 14.25×5.25 to 11×4.75 , average 12×5.1 mm.).

GREAT NAMAQUALAND. Keetmanshoop (Michaelsen, fide Degner; 1 shell, 13.5×6.5 mm.).

Mousson founded *opposita* on a single damaged example, collected by Schinz in a recent calcareous marl in the Upingtonia District, south of Ovamboland; von Martens has recorded it, also as a fossil singleton, from Bechuanaland, though without any authority for its identification. The type appears to be lost, but an immature example from Ovamboland of *X. damarensis* var. *minor*, from a series about 14 mm. long when mature, coincides with Mousson's figure and agrees with his description; J. R. Tomlin confirms my view as to the synonymy.

var. *subradiata* Bttg.

1910. *Ena* (*Eburnea*) *damarensis* H. Ad., var. *subradiata* Bttg., loc. cit., p. 443. D.

1922. *Ena* (*Eburnea*) *damarensis* H. Ad., var. *subradiata* Bttg., Dgnr., loc. cit., p. 31. N.

Hab. DAMARALAND. Kurikaubmund, Swakop Valley (Rintelen).

Founded on a single particularly obese example, with 8 whorls, 21×10 mm. in length and breadth.

Xerocerastus burchelli (Gray).

(Pl. III, figs. 12-15.)

Ref. List Nos. 305, 314, 326.

1834. *Bulimus burchelli* Gray, P.Z.S., p. 66. D.

1886. *Buliminus (Mastus) psammophilus* Bttg., Ber. Senckenb. Ges., p. 23, pl. ii, fig. 2. D.F.

1892. *Buliminus layardi* M. and P., A.M.N.H., ix, p. 90, pl. v, fig. 11. D.F.

Hab. GREAT NAMAQUALAND. Bullspoort (Tucker); Choarib (Hermann); Nakob (Barnard); Aroab (Arahoab); Haruchas Farm, near Gokhas (*psammophilus*, in Senckenberg Museum).

Burchelli was described from Taku in British Bechuanaland and is rather widely distributed over Bechuanaland, Griqualand West and the north-west of the Cape Province. *Layardi* was described from Kobis, Bechuanaland, and *psammophilus* from Khuis in the same province; in so far as concerns the synonymy set forth above, I need do no more than quote the opinion of the two eminent experts, here given, in support of my own.

Dr. F. Haas kindly compared specimens of *burchelli* with the type of *psammophilus* and writes: "*X. psammophilus* Bttgr. is quite certainly identical with *burchelli* Gray and must be placed in its synonymy."

With regard to *layardi*, its authors sought to differentiate their species from *burchelli* in the following words: "This seems to us to differ from *B. burchelli* (Gray) in the smaller size, want of umbilication, greater reflection of columella, less ventricose whorls, and more vivid painting."

After careful study of the types, Burnup's opinion, in which I concur, was: "Considering M. and P.'s comparison with *burchelli*, I find *layardi* quite as much umbilicate as *burchelli*; the difference in size is quite immaterial; I cannot see that the columella is any more reflexed, and in my series, as in Connolly's, there are specimens quite as vividly painted. I can only consider *layardi* a synonym of *burchelli*."

In this connection I need only add that among eighty specimens of *burchelli* which have been measured, the largest is 18×7 and the smallest 12.4×5 mm.; the three shells of the type set are 14.5×6 , 14.2×6.2 , and 13.5×5.6 mm., while the type of *layardi* is 12.25×5.5 mm., and *psammophilus* is said to range from 13.25 to 14×6 to 6.5 mm.

The exact relationship, however, between *burchelli* and *damarensis*

var. *minor* raises a far more difficult question. The former's range of measurements completely covers that of the latter; the flammate marking in comparatively unbleached specimens is common to both and the decussate sculpture, though possibly more pronounced in *burchelli*, hardly provides ground for separation. In fact, *damarensis* var. *minor* appears to be far more nearly akin to *burchelli* than to the larger races of *damarensis*, and further investigation will probably prove them to be identical. The anatomy of *burchelli*, however, is unknown, and while the var. *minor* is distributed from Damaraland northward, and *burchelli* mainly south of the Orange River, both are extremely uncommon in the intermediate district of Great Namaqualand, where all but one of the known localities for *burchelli* are near the Kalahari border.

It may be advisable, therefore, to recognise them as distinct, chiefly on geographical grounds, until it becomes possible to study their comparative anatomy.

Xerocerastus schultzei (Bttg.).

(Pl. III, fig. 16.)

Ref. List No. 328.

1910. *Ena* (*Eburnea*) *schultzei* Bttg., *loc. cit.*, p. 442, pl. xxviii, fig. 9. D.F.

This species has not been yet recorded from S.W. Africa, but I figure it in order to present a complete series of the genus to which it belongs. It was described from Bechuanaland and is also known from British Bechuanaland and Griqualand West, while it is remarkable for being the only member to occur outside the south-west corner of the continent, being established in the Northern Transvaal in the neighbourhood of the Messina mines, whither it was probably carried by natives, who are fond of making these kinds of shells into necklaces.

Section *Lubricetta* Haas, 1928.

Lubricetta was proposed as a subgenus of *Bocageia* for *B. rollei* Haas; it will be shown, however, that this is simply a small form of *Xerocerastus subteres* (Bttg.), so that *Lubricetta* must be treated as a section of *Xerocerastus*, with *subteres* as its type. The shells attributable to this section, of which no species was known prior to 1910, differ slightly in form from those of *Xerocerastus* s.s. and have a rather blunter apex; they constitute a small, but very difficult group, of which the extremes, the large *sericus* and small *nitens* of Degner, would be easily

separable, were it not for the great variability of the intermediate *subteres*, which almost bridges the gap between them. However, the following statistics, based on the examination of more than 150 specimens, and taking into consideration size, sculpture, and distribution, may tend to establish all three as distinct species.

Xerocerastus subteres (Bttg.).

(Pl. III, figs. 20-24, 27-29.)

Ref. List No. 332.

1910. *Ena (Eburnea) subteres* Bttg., *loc. cit.*, p. 444, pl. xxviii, fig. 8. D.F.

1928. *Bocageia (Lubricetta) rollei* Haas, *Senckenbergiana*, x, p. 92, figs. 5 and 6, p. 94. F.D.

The localities and dimensions of various series are as follows :—

DAMARALAND. 140 km. inland from Swakopmund (type, Rintelen ; 19.5×7 mm.) ; Usakos (Frames ; Barnard ; 20 shells, ranging from 21×7 down to 12.5×5.4 mm., with average of 16.86×6.62 mm.).

Karibib (Frames ; 3 shells, from 13.8×5.5 to 12.2×5.6 , average 13.2×5.5 mm.).

Between Usakos and Karibib (Frames ; 16 shells, from 22.6×8.1 to 15.1×6 and 15×6.2 , average 17.7×6.3 mm.).

The above localities are within 30 miles of each other.

Neineis, 50 miles N.W. of Usakos (Haughton ; 7 shells, 16×5.2 and 15.7×5.3 to 12.8×5.2 , average 14.3×5.2 mm.) ; Uis, 20 miles N.W. of Neineis (Haughton ; 4 shells, 17.8×5.5 to 16.2×5.5 and 16×5.9 , average 16.5×5.7 mm.).

NAMIB. Swakopmund (Durban Light Infantry ; 5 shells, 26×7.2 , 25.9×7.7 , 21×7 , 21×6.8 , and 17×5.2 , average 22.2×6.8 mm.).

KAOKOVELD. Kaoko Otavi (Barnard ; 43 shells, from 19×7 and 18.5×6.5 to 12×5 , average 15.2×5.75 mm.).

Between Otjitundua and Ombombo (Barnard ; 13 shells, from 17×6 to 12.5×5 , average 14.2×5.3 mm.).

These three localities are less than 20 miles apart.

Zesfontein, 60 miles from Kaoko Otavi (Lawrence ; 2 shells, 23.1×8 and 23×7.5 mm.).

GREAT NAMAQUALAND. Near Naauwklouf (*rollei*, ex coll. Rolle ; 15×6.1 mm.).

It will be seen that this species has been collected so far in five limited areas and that the average from all, except the large pair from Zesfontein and the strange set from Swakopmund, falls well

below the size of the type. Until large series occurred and full statistics were available, it appeared possible that the smaller forms might be referable to *nitens* and the larger to *subteres*, but I do not think such is the case, as all have similar, though variable, decussate sculpture, stronger than in *nitens*, and the geographical distribution is consistent with their being conspecific.

The series from Uis, Neineis, and Swakopmund differ considerably from the typical form, being comparatively more slender and practically devoid of spiral sculpture; I would, in fact, have reckoned them to be a distinct species, were it not that the contour of the smaller examples can be matched by one or two individuals among the large set from Kaoko Otavi.

Subteres was founded on a single bleached shell, 19.5×7 mm., and *rollei* on a single mature and one or two rather immature examples, of which the former measures 15×6.1 mm., in brilliantly fresh condition, when the shell is very glossy and coloured a beautiful pinkish brown. Since this was the only material available to Dr. Haas when considering the status of the latter, it is not surprising that he failed to notice the connection between the two shells; however, there is no doubt as to their being conspecific. The series of 43 from Kaoko Otavi, which ranges from 19×7 mm., practically the dimensions of Boettger's type of *subteres*, down to 12×5 mm., little larger than *nitens*, includes several examples about 15×6 mm., thus agreeing with *rollei*, and an immature paratype of the last named, kindly furnished by its author, is quite inseparable from them. Naaauwkloof is situate about 160 miles S. of Usakos, and is the most southerly locality in which *subteres* has yet been collected.

Xerocerastus nitens (Dgnr.).

(Pl. III, fig. 25.)

1922. *Ena (Eburnea) nitens* Dgnr., loc. cit., p. 28, fig. 10. D.F.R.

Hab. DAMARALAND. Otjikoto Lake (Michaelsen).

Eight adult examples were collected, of which 6 varied from 11.5×5.5 to 11×5.3 and the other 2 were 9×5 mm., giving a rough average of 10.7×5.26 mm.

If actually distinct from the foregoing, this is the smallest of the section. The later sutures are remarkably white, the transverse sculpture almost absent and the spiral extremely close and faint, so that the shell is more glossy than its confrères.

It is only yet known from the original set, and the fact of its hailing

from the same district as the large *sericus*, and apparently rather remote from the haunts of *subteres*, lends colour to its distinctness.

Xerocerastus sericus (Dgnr.).

(Pl. III, figs. 30, 31.)

1922. *Ena (Eburnea) serica* Dgnr., *loc. cit.*, pp. 23, 24, fig. 7 e-g. D.F.

Hab. DAMARALAND. Tsumeb (type, Michaelsen; Rogers); Otavi Mountain (Durban Light Infantry); Gaub (Tucker).

A large form, of which the type set of four from Tsumeb measure from 28×10 to 23.5×10.5 mm., with average of 25.1×10.25 mm., and Rogers' series of 27, ranging from 23.3×9.8 down to 20×10 , 20×9 and 20×8.5 mm., average 21.16×9.4 mm.

The pair from Otavi Mountain somewhat resemble the type in size, being 28×12.2 and 27.4×12.7 mm., while the pair from Gaub are somewhat smaller, each measuring 19×8.5 mm.

These localities are within a radius of 12 miles and none others are yet known to me. The shell is remarkable for its size and particularly silky sculpture, caused by the very close, strong, transverse striae being slightly interrupted by microscopic spiral striation. The fact just mentioned that this large species and its other extreme, the diminutive *nitens*, are found within 20 miles of one another, with no near occurrence of *subteres*, may either suggest their distinctness, or that *subteres* is a Bastard race, caused by the inter-breeding between other forms.

FAMILY SUCCINEIDAE.

Genus *Succinea* Drap., 1801.

Succinea badia Morel.

1868. *Succinea badia* Morel., Voy. Welwitsch, p. 54, pl. i, fig. 4. D.F.

Hab. GREAT NAMAQUALAND. Bullspoort (Tucker).

DAMARALAND. Homeib R., near Klip (Siegmann); Sandfontein (Barnard).

KAOKOVELD. Ombombo; Kaoko Otavi (Barnard).

Described from Calemba Is., Angola; the examples from S.W.A. are quite typical. It is a large species, which has been collected as far south as Excelsior, Modder River (Swan).

It occurs in large numbers in the flat open valleys between Otji-tundua, Ombombo, and Kaoko Otavi, which are only flooded in the summer season, and then only occasionally. In the dry season the animals hide in the ground under logs or at the roots of grass.

Succinea delalandei Pfr.

Ref. List No. 460.

1821. *Helix* (*Cochlohydra*) *elongata*, var. γ , Fér., Tabl. Syst. Moll., pt. 3, p. 31 (or 27), L., and Hist. Nat. Moll., pl. xia, fig. 11. F.

1851. *Succinea delalandii* Pfr., Zeitschr. für Malak., viii, p. 28. D.

Hab. DAMARALAND. Between Nuragas and Otjituo; Grootfontein; Namutoni (Barnard).

A slender species, whose headquarters appear to be in the Cape Peninsula, but also known from British Bechuanaland and recorded by Craven from Oliphants River, Transvaal.

Succinea exarata Krs.

Ref. List No. 461.

1848. *Succinea exarata* Krs., Südafr. Moll., p. 74, pl. iv, fig. 15. D.F.

Hab. DAMARALAND. Gobabis (subfossil, Hermann, fide Boettger).

Described from Natal, where, if a valid species, it is extremely rare; I am inclined to doubt the correctness of the Damaraland locality.

Succinea moussoni Mts.

Ref. List No. 462.

1887. *Succinea* (?) sp., Mouss., J. de C., xxxv, p. 298. N.

1904. „ „ *moussoni* Mts., Die Kalahari, p. 755, fig. 2. D.F.

Hab. OVAMBOLAND. Upingtonia District, south of Ovamboland (subfossil, Schinz); Sodanna (Passarge).

Also collected in subfossil condition by Passarge in Bechuanaland; the figure appears to represent an immature example of *badia* Morel.

Succinea striata Krs.

Ref. List No. 466.

1848. *Succinea striata* Krs., Südafr. Moll., p. 73, pl. iv, fig. 16. D.F.

1922. „ „ „ Dgnr., loc. cit., p. 40. N.

Hab. DAMARALAND. Gobabis (subfossil, Hermann); Okahandja (Michaelsen).

Described from Natal, and distributed over the Cape Province, British Bechuanaland, O.F.S., Transvaal, as well as Central and North East Africa.

FAMILY ONCHIDIIDAE.

Genus *Onchidella* Gray, 1850.

Onchidella maculata Plate.

Ref. List No. 474.

1893. *Onchidella maculata* Plate, Zool. Jahrb. Jena, vii, pt. 1, p. 201, pl. vii, fig. 4; pl. ix, figs. 43, 44; pl. x, figs. 45-49, 52; pl. xi, fig. 68; pl. xii, fig. 101. D.F.A.

1925. *Onchidella maculata* Plate, Wats., Ann. S. Afr. Mus., xx, p. 285. N.

Hab. NAMIB. Angra Pequenas (fide Plate).

A slug of semi-marine habit, but classified as non-marine.

FAMILY LYMNAEIDAE.

Genus *Lymnaea* Lam., 1799.

Lymnaea natalensis Krs.

Ref. List No. 491.

1848. *Limnaeus natalensis* Krs., Südafr. Moll., p. 85, pl. v, fig. 15. D.F.

1914. *Limnaea natalensis* Krs., D. and G., Rev. Zool. Africaine, p. 38. L.

1919. *Limnaea (Radix) natalensis* Krs., Germ., Bull. Mus. Paris, pp. 47, 199. D.N.

1920. *Limnaea (Radix) natalensis* Krs., Germ., Voy. Babault, p. 129. D.

1925. *Limnaea natalensis* Krs., Conn., Trans. R. Soc. S. Africa, xii, p. 188. N.

1926. *Radix aff. natalensis* Krs., Wenz, loc. cit., p. 158. N.L.

1927. *Lymnaea natalensis* Krs., P. and B., Bull. Amer. Mus. N.H., liii, p. 144, pl. xi, fig. 6. N.F.

Hab. KAKOVELD. River terraces at Kamanyab (subfossil, Barnard).

NAMIB. 20 km. E. of Bogenfels (Eocene, Kaiser and Beetz).

Two of Barnard's shells from Kamanyab are undoubtedly *natalensis* and there is no reason why those cited by Wenz from Namib should not also belong to the same variable species. A third example from Kamanyab, however, is very different, being comparatively smaller, with a more exerted spire, and possibly referable to the following species.

Lymnaea caillaudi Bgt.

1883. *Limnaea caillaudi* Bgt., Ann. Sci. Nat. Zool., xv, p. 89, pl. x, figs. 100, 101. D.F.

1883. *Limnaea africana* Rüpp., Bgt., *ibid.*, p. 95, pl. x, fig. 99. D.F.

1908. „ „ „ N. and A., Ann. Sci. Nat. Zool., viii, p. 261. D.F.

1909. *Limnaea caillaudi* Bgt., Ptry., Mem. Inst. Égypte, vi, p. 46, pl. iii, figs. 36-38. N.F.

1919. *Limnaea africana* Rüpp. (= *caillaudi*, *alexandrina*, *laurenti*, *lavigeriei*, *acroza*, *kynganica* and *zanzibarica* Bgt.), Germ., Bull. Mus. Paris, pp. 181, 185. N.

1920. *Limnaea africana* Rüpp., Germ., Voy. Babault, p. 141, pl. iv, figs. 6-11 and text-figs. 31-59. D.F. and synonymy.

1927. *Lymnaea (Radix) caillaudi* Bgt. (= *africana* Rüpp., etc.), P. and B., Bull. Amer. Mus. N.H., liii, p. 113. N.

NOTE.—Only the more important references are cited above.

Hab. OVAMBOLAND. Upper reaches of Omuramba-Omatoka R. (Shortridge).

Germain selected *africana* Rüpp. as the prior name to apply to a group of so-called species which differ from *natalensis*, in their typical extreme, in their more slender contour and longer spire, on the ground that Bourguignat (1883) mentioned *africana* on p. 85 of his paper, before *caillaudi* and others of the group, but P. and B. point out that its occurrence on that page is “nomen nudum,” so that *caillaudi* Bgt. has priority.

The species, if such it be, is widely distributed in Egypt and tropical Africa, often occurring in company with, and merging into *natalensis*, of which it and many other species, described as distinct, are probably at most merely varieties.

The shells from Ovamboland are rather small and extremely slender.

Lymnaea damarana Bttg.

Ref. List No. 490.

1910. *Limnaea damarana* Bttg., *loc. cit.*, p. 450, pl. xxviii, fig. 16. D.F.

Hab. DAMARALAND. Gobabis (subfossil, Hermann).

The dimensions given by Boettger are: shell, 11×6; apert., 7×4 mm. If it bears any near resemblance to his figures, it is certainly very distinct; I have not seen examples.

Lymnaea subtruncatula Bttg.

Ref. List No. 493.

1910. *Limnaea subtruncatula* Bttg., *loc. cit.*, p. 451, pl. xxviii, fig. 17. D.F.

1926. *Galba (Galba) aff. truncatula* Müll., Wenz, *loc. cit.*, p. 158. N.L.
Hab. DAMARALAND. Gobabis (subfossil, Hermann).

NAMIB. 20 km. E. of Bogenfels (Eocene, Kaiser and Beetz).

I unite these two references, although it is possible that they do not refer to the same species. However, Boettger separated his *subtruncatula* from *truncatula* Müll. mainly on account of its strongly twisted columella; it is true that this feature is very unusual in Müller's species, but it is emphasized in a good series in my collection from Merton, Surrey, England, which appear to agree with Boettger's figure. It is advisable to wait till many more specimens from S.W. Africa are available for examination, before attempting to dabble in their probable synonymy.

FAMILY PLANORBIDAE.

Genus *Planorbis* Geoffroy, 1767.

Planorbis pfeifferi Krs.

Ref. List Nos. 498, 501.

1848. *Planorbis pfeifferi* Krs., Südafr. Moll., p. 83, pl. v, fig. 7. D.F.

1910. „ (*Coretus hermanni* Bttg., *loc. cit.*, p. 452, pl. xxviii, fig. 18. D.F.

1921. *Planorbis (Planorbis) hermanni* Bttg., Germ., Rec. Indian Mus., xxi, p. 20. N.

1922. *Planorbis pfeifferi* Krs., Dgnr., *loc. cit.*, pp. 40, 42, fig. 15. N.F.

1925. „ „ „ Conn., Trans. R. Soc. S. Africa, xii, p. 195, pl. viii, figs. 16-19. N.A.R.

Hab. DAMARALAND. Grootfontein (Lightfoot; Michaelsen); Okosongomingo (Thomsen); Okaputa Pan (*hermanni*, Hermann).

OVAMBOLAND. “Omanbonde” [*sic*] “(Ovampoland)” (in Indian Museum); upper reaches of Omuramba-Omatoka R. (Shortridge).

A species of wide distribution, occurring apparently as far north as the Sudan, and very variable, even in the same pool, in regard to its altitude and position of the aperture in relation to the penultimate whorl. Germain (1921) remarks that *hermanni* is merely a depressed variety of *pfeifferi*, with a descending last whorl, but Haas, who has

kindly examined Boettger's type, informs me that there is no object whatever in retaining the former even as a variety; I therefore place it in synonymy.

Planorbis salinarum Morel.

Ref. List No. 503.

1868. *Planorbis salinarum* Morel., Voy. Welwitsch, p. 85, pl. v, fig. 4. D.F.

1921. *Planorbis* (*Planorbis*) *salinarum* Morel., Germ., Rec. Indian Mus., xxi, p. 22. N.

Hab. OVAMBOLAND. Sodanna (Passarge).

Described from Angola and also recorded by von Martens from Lake Ngami.

Degner (*loc. cit.*, p. 41) doubts the accuracy of Martens' identification of these shells, which he considers may bear closer relationship to *pfeifferi* Krs.

Planorbis natalensis Krs.

Ref. List No. 500.

1848. *Planorbis natalensis* Krs., *loc. cit.*, p. 83, pl. v, fig. 9. D.F.

Hab. DAMARALAND. Gobabis (subfossil, Hermann).

Described from the Umgeni Valley, Natal, and also recorded from British Bechuanaland and Port Elizabeth.

A small species, near *costulatus* Krs., but with weaker sculpture; I have never been able to find a match for the typical form, and doubt whether any of its records outside Natal are correct.

Planorbis gibbonsi Nels.

Ref. List No. 497.

1878. *Planorbis gibbonsi* Nels., Q.J. of C., i, p. 379, pl. iv, fig. 3. D.F.

1914. „ (*Tropidiscus*) *gibbonsi* Nels., Dautz. and Germ., Rev. Zool. Afr., iv, p. 42. N.

1927. *Planorbis* (*Gyraulus*) *gibbonsi* Nels., Pilsb. and Beq., Bull. Amer. Mus. N.H., liii, p. 126, fig. 8. N.F.

1927. *Planorbis gibbonsi* Nels., Conn., J. of C., xviii, p. 172. N.

Hab. KAKOVELD. Kamanyab (subfossil); near Otjitundua (Barnard).

Widely diffused over nearly the whole of tropical and South Africa.

Planorbis anderssoni Ancey.

Ref. List No. 494.

1890. *Planorbis anderssoni* Ancey, Bull. Soc. Mal. Fr., p. 161. D.

Hab. OVAMBOLAND. Ovambonde (Andersson and Chapman).

Originals from the above locality not being forthcoming, knowledge of this species rests upon examples from Durban, which were declared by Ancey to be typical. If this determination is correct, *anderssoni* is rather widely distributed throughout South Africa.

Planorbis leucochilus M. and P.

Ref. List No. 499.

1903. *Planorbis leucochilus* M. and P., A.M.N.H., xii, p. 607, pl. xxxi, fig. 3. D.F.

1922. *Planorbis leucochilus* M. and P., Dgnr., loc. cit., p. 43. N.

Hab. DAMARALAND. Grootfontein (Michaelsen).

Described from Killarney Lake, Maritzburg.

Discussion on the affinities of the small and the larger thin, closely coiled races of *Gyraulus*, as represented respectively by such as *anderssoni* Ancey and *leucochilus* M. and P., and *gibbonsi* Nels. and *crawfordi* M. and P., can lead to no definite conclusions until large series have been collected for considerable periods in the same locality, in order to obtain, when possible, fresh, uncoated specimens, and to determine the influence on their development of local and seasonal conditions. In exemplification of this statement, I may mention that I collected a large number of Gyrauli at the bridge over the Black River, Maitland, C.P., on frequent occasions during the three years 1908 to 1910, and during the first two years found none but extremely small examples, which could be referred to *leucochilus* or *anderssoni* according to the degree in which their peristome was white and thickened, or simple. In the third year, however, on at least two visits I collected what appeared to be the same species, but of greatly increased size, agreeing perfectly with *gibbonsi*, and displaying in many cases several of the white thickenings at various stages of growth, on which *leucochilus* was founded, while a few were free of this peculiarity, and might well be mature *anderssoni*.

Degner's minute shells hardly appear to me to be quite representative of the Durban race of *anderssoni*, and, judging from their locality, may possibly be the true embodiment of Ancey's species, but

they are also very near to *leucochilus*, so that it is advisable to leave the question of nomenclature as it stands for the present, subject to the foregoing remarks.

Genus *Segmentina* Fleming, 1818.

Segmentina planodiscus (M. and P.).

Ref. List No. 505.

1897. *Planorbis* (*Segmentina*) *planodiscus* M. and P., A.M.N.H., xix, p. 638, pl. xvii, fig. 10. D.F.

1923. *Segmentina planodisca* M. and P., Germ., Rec. Indian Mus., xxi, p. 167. D.N.

Hab. OVAMBOLAND. Ovambonde (in Indian Museum and my collection).

Described from Natal, this beautiful species, which is remarkable for the large number of its septa, of which I have counted as many as from 7 to 10 in the last whorl of shells $5\frac{1}{2}$ mm. in diameter, has been collected nowhere else than in Albert Nyanza and Ovamboland, if the rather dubious record of Ovambonde is correct; I can confirm the accuracy of Germain's determination, but it may well be that the localities of this, and other species described by Ancey, Morelet and M. and P., have been mixed up, owing mainly to the carelessness of the collectors in Europe, who received the original examples.

Genus *Bulinus* Müll., 1781.

(=*Isidora* Ehrn., 1831.)

Bulinus angolensis (Morel.).

Ref. List No. 516.

1866. *Physa angolensis* Morel., J. de C., xiv, p. 162. D.

1873. „ *algoensis* Morel., Sow., Conch. Icon., pl. vii, fig. 53. D.F. (Err. type.)

Hab. DAMARALAND. (Geale, "*algoensis*" in British Museum.)

OVAMBOLAND. Tamansu; Ongandjera (Barnard).

Described from Angola; a beautiful globose species, but extremely near the more globose forms of *B. natalensis* (Krs.), with which it may ultimately prove to be conspecific.

Bulinus parietalis (Mouss.).

Ref. List No. 522.

1887. *Physa parietalis* Mouss., J. de C., xxxv, p. 298, pl. xii, fig. 8. D.F.

1922. *Isidora parietalis* Mouss., Dgnr., loc. cit., pp. 44, 45, fig. 16. D.F.R.

Hab. OVAMBOLAND. Ondongua (Schinz); Andoni (Barnard).

DAMARALAND. Okosongoho (Hermann); Otjituezu, 66 km. N.E. of Frauenstein and 50 km. E.N.E. of Windhoek (Michaelson).

Also recorded from Bechuanaland, British Bechuanaland and Port Elizabeth, the last a somewhat improbable determination.

Very similar to *angolensis*, but distinguishable by its costulate sculpture and prominent callus.

Bulinus tropicus (Krs.)

(=*cyrtonota* Bgt. and *craveni* Ancey (*lirata* Crvn., non Trist.)).

Ref. List No. 524.

1848. *Physa tropica* Krs., loc. cit., p. 84, pl. v, fig. 12. D.F.

1922. *Isidora diaphana* Krs., Dgnr., loc. cit., p. 47, fig. 18. D.F.

Hab. DAMARALAND. Okaputa Pan (subfossil, Hermann); Neitsas Farm, near Grootfontein (*diaphana*, Fock).

KAOKOVELD. Kamanyab (subfossil, Barnard).

Tropicus was described from the Transvaal and is distributed throughout the Union of South Africa, while it appears to occur also in Kenya Colony and Abyssinia. It is distinguishable from *B. natalensis* (Krs.) through having a straight, or slightly concave, columella with a more or less broadly reflexed margin, whereas in *natalensis* the columella usually has a slight bulge or twist half-way down and the margin is extremely narrowly reflexed. Paratypes of *diaphanus* in my collection do not resemble *tropicus* in the columellar region, but may well be immature examples of *natalensis*; Degner's and Barnard's specimens resemble rather small forms of *tropicus*, such as occur in other localities in South Africa.

Bulinus natalensis (Krs.).

Ref. List No. 521.

1841, 43. *Physa natalensis* Krs., Küst., Conch. Cab. (Limn.), p. 8, pl. i, figs. 12-14. D.F.

Hab. OVAMBOLAND. Upper reaches of Omuramba-Omataka R. (Shortridge).

A small, rather degenerate race, such as often occurs in streams liable to periodical desiccation; the columella is longer and straighter and the contour more slender than in *parietalis*, and the callus weak or absent; I have a very similar series from a similar locality 10 miles from the Victoria Falls.

The species is known to inhabit Natal, Zululand, Rhodesia, British Bechuanaland, Griqualand West and Lorenzo Marques.

Bulinus diaphanus (Krs.).

Ref. List No. 519.

1848. *Physa diaphana* Krs., Südafr. Moll., p. 84, pl. v, fig. 11. D.F.

1929. *Isidora* „ „ Adens., *loc. cit.*, p. 397. N.

Hab. DAMARALAND. Between Nuragas and Fockshof (Lebzelter).

Described from Natal and, as stated above, a species of dubious validity; I have not seen the two specimens on which Adensamer based his determination.

Subgenus *Pyrgophysa* Crosse, 1879.

Bulinus forskali (Ehrn.).

Ref. List No. 520.

1831. *Isidora forskalii* Ehrn., Symb. Phys., Evert., 3rd species. D.

1922. „ *forskali* Ehrn., Dgnr., *loc. cit.*, p. 48. N.

Hab. DAMARALAND. Neudamm; Teufelsbach, 25 km. S.S.E. of Okahandja (Michaelsen).

OVAMBOLAND. Ondongua (forma *apiculata* Morel.); Mafa, N. of Ondongua; Ukualuthi (Barnard).

KAOKOVELD. Near Otjitundua (forma *semiplicata* Morel., Barnard).

A most variable species, easily recognisable through its many whorls and attenuated form, frequently exhibiting extreme dimorphism, even in series from the same pool.

Originally described from Egypt, it occurs over nearly the whole of South and Central Africa, as well as in the Comoro and Mascarene Is.; various authors, with whom I see no reason to disagree, have placed in its synonymy *wahlbergi* and *jickelii* Krs., *gradata* M. and P., *nyangweensis* D. and P., *lamellosa* Roth, *vitrea* Parr., *fischeriana* Bgt., *beccarii* Paladh., *dunkeri* Germ. (= *scalaris* Dkr.),

schmidtii Dkr., *mariei* Crosse, *spiralis* Fér., *apiculata*, *capillacea*, *clavulata*, *semplificata* and *turriculata* Morelet.

It is probable, too, that *dautzenbergi* Germ., *ludovicianus* Mitre, *moreleti* and *osorioi* Nobre are merely forms of this same species.

Genus *Physopsis* Krs., 1848.

Physopsis africana Krs.

Ref. List No. 527.

1848. *Physopsis africana* Krs., Südafr. Moll., p. 85, pl. v, fig. 14. D.F.

1914. *Physopsis africana* Krs., D. and G., Rev. Zool. Africaine, iv, p. 45. L.

1919. *Physopsis africana* Krs., Germ., Bull. Mus. Paris, p. 47. D.

1922. " " " Dup. and Putz., Ann. Soc. Zool. Belg., liii, p. 74. N.

1929. *Physopsis africana* Krs., P. and B., Bull. Amer. Mus. N.H., liii, p. 144, pl. xi, fig. 6. N.F.

Hab. OVAMBOLAND. Upper reaches of Omuramba-Omatoka R. (Shortridge).

A single large example, agreeing perfectly with the typical form from Natal.

This species is practically always imperforate, and occurs in the Transvaal, Zululand, Cape Province, Lorenzo Marques, Belgian Congo and many parts of Central Africa, but there is so great divergence of opinion as to its range of variation and synonymy that I refrain from discussing it in the present paper.

FAMILY ANCYLIDAE.

Genus *Burnupia* Walker, 1912.

Burnupia trapezoidea (Bttg.).

Ref. List No. 506 (pars).

1907. *Ancylus trapezoideus* Bttg., in Schultze, Aus Namaland u. Kalahari, p. 708. N.

1923. *Burnupia trapezoidea* Bttg., Walk., The Ancyliidae of South Africa, p. 57, pl. i, figs. 16, 17. D.F.

Hab. KAKOVELD. Kamanyab (subfossil, Barnard).

Described from Witkop, British Bechuanaland, in subfossil condition, this species appears to be living in the Transvaal, Orange Free

State and Griqualand West, while I have seen very typical subfossil examples from Cape St. Francis. It is also recorded by von Martens from Tanganyika Territory.

It has a large, narrow shell, usually with a very prominent apex, so greatly deflexed as to project beyond the right margin of the circumference.

Burnupia sp.

1922. *Ancylus* sp., Dgnr., *loc. cit.*, p. 39, figs. 14*b*, 14*c*; p. 43. D.F.

Hab. DAMARALAND. Neudamm, 42 km. E.N.E. of Windhoek (Michaelsen).

GREAT NAMAQUALAND. Seeheim (Michaelsen).

Very immature examples in bleached condition; the apical sculpture, however, appears to be that of *Burnupia*, and they may well be the young of the foregoing species.

ORDER PECTINIBRANCHIA.

FAMILY PILIDAE

(=AMPULLARIIDAE).

Genus *Pila* Bolten, 1798.

(=*Ampullaria* Lam., 1799.)

Pila occidentalis (Mouss.).

Ref. List No. 544.

1887. *Ampullaria occidentalis* Mouss., J. de C., xxxv, p. 299, pl. xii, fig. 9. D.F.

1910. *Ampullaria occidentalis* Mouss., Sow., Proc. Mal. Soc., ix, p. 60. L.

1919. *Ampullaria occidentalis* Mouss., Germ., Bull. Mus. Paris, p. 48. D.N.

1925. *Ampullaria occidentalis* Mouss., Alderson, Studies in Ampullaria, p. 85, pl. xvii, figs. 5-7. N.F.

1929. *Pila occidentalis* Mouss., Adens., *loc. cit.*, p. 397, pl. xiii, fig. 5. N.F.

Hab. OVAMBOLAND. Kunene River (Geale; Schinz); below Erikson Drift (Lebzelter); Ondongua (Barnard).

DAMARALAND. Nuragas (Lightfoot); Okosongoho (Hermann).

Also recorded from Angola and Bechuanaland.

Pila wernei (Phil.).

1851. *Ampullaria wernei* (= *rugosa* Parr. in litt.), Phil., Conch. Cab., p. 19, pl. v, fig. 4; pl. xvii (1852), fig. 2. D.F.

1910. *Ampullaria wernei* Phil., Sow., Proc. Mal. Soc., ix, p. 62. L.

1925. „ „ „ Alderson, loc. cit., p. 89, pl. xviii, figs. 2, 5, 6.

Hab. OVAMBOLAND. Okovango R. (Wohlfahrt); upper reaches of the Omuramba-Omatoka R. (Shortridge).

Described from the Sudan and recorded from Uganda, Zanzibar, Mozambique, the Belgian Congo, Nigeria, Ubangui and Abyssinia.

Shortridge's largest example measures 62×56 mm. in height and width, and is remarkable for its beautiful olive-green ground colour, with numerous narrow bands of darker green, and a broad buff zone around the suture.

FAMILY VIVIPARIDAE.

Genus *Viviparus* Montf., 1810.

Viviparus leopoldvillensis (Putz.).

1898. *Paludina leopoldvillensis* Putz., Bull. Soc. Mal. Belg., xxxiii, p. xxii, figs. 1, 2. D.F.

1909. *Vivipara leopoldvillensis* Putz., Kob., Conch. Cab., p. 380, pl. lxxv, figs. 10, 11. D.F.

1920. *Vivipara leopoldvillensis* Putz., Germ., Voy. Babault, p. 214. D.

1927. *Viviparus* „ „ P. and B., Bull. Amer. Mus. N.H., liii, p. 207. N.

Hab. OVAMBOLAND. Junction of Okovango and Omuramba-Omatoka rivers (Shortridge).

Described from the Stanley Pool, Belgian Congo, its sole recorded locality.

The sculpture of this species is described as consisting of very fine close spiral lines and usually decussate growth lines; the shell is imperforate, yet with reflexed columellar margin, greenish black in colour, bluntly subangulate at the periphery, columella straight, extending to the base and forming an angle with the margin.

The Ovambo shells accord with the above in size and the unusually strong close spiral sculpture, and in all other features except the straight columella, which is only present in one example, but all show the basal angle, and I think there can be no doubt as to their correct determination.

Viviparus duponti (Rehbr.) (= *Bellamya bellamyi* Jouss.), from French Guinea and Senegal, considered by Germain to be a variety

of *V. unicolor*, and *V. liberianus* Schepm., from Liberia, must be extremely near akin to the present species—all, in fact, may well be identical—but without acquaintance with the shells, it is impossible to decide on their relationship.

All Shortridge's univalves were collected along the Omuramba-Omataka, within 15 miles of its junction with the Okovango, and the fact that two of his bivalves from the latter river correspond very closely to two described by Putzeys from Stanley Pool, in the same paper as *V. leopoldvillensis*, lends additional colour towards the name being correct.

FAMILY THIARIDAE

(=MELANIIDAE).

Genus *Melanoides* Oliv., 1807.

(= *Melania* Lam.)

Melanoides tuberculata (Müll.).

Ref. List No. 557.

1774. *Nerita tuberculata* Müll., Verm., ii, p. 291. D.

Hab. DAMARALAND. Namutoni (Barnard).

Described from Coromandel, this well-known species is widely distributed over nearly the whole of Africa, Southern Asia and many islands of the Indian and Pacific Oceans.

Melanoides victoriae (Dhrn.).

Ref. List No. 558.

1865. *Melania victoriae* Dhrn., P.Z.S., p. 234. D.

Hab. OVAMBOLAND. Kunene R., near Great Falls (Barnard).

Described from the Victoria Falls; a smoother form than the foregoing, but extremely closely related to *M. crawfordi* (Brot.).

Genus *Cleopatra* Trosch., 1857.

Cleopatra bulimoides (Oliv.).

var. *welwitschi* Mts.

(Pl. III, fig. 32.)

1868. *Paludina bulimoides* Oliv., Morel., Voy. Welwitsch, p. 96. N.

1898. *Cleopatra* „ „ var. *welwitschi* Mts., D.-O.-A., p. 185. D.

Hab. OVAMBOLAND. Upper reaches of Omuramba-Omataka R. (Shortridge).

Previously known only from Angola, where it appears to replace the typical form.

It has a rather large shell, frequently more obese and with slightly flatter whorls than the Egyptian race, but does not seem specifically distinct.

var. *richardi* Germain.

(Pl. III, fig. 26.)

1911. *Cleopatra bulimoides* Oliv., var. *richardi* Germ., Docs. Sci. Miss. Tilho, ii, p. 200, pl. ii, figs. 5, 6. D.F.

Hab. OVAMBOLAND. Upper reaches of Omuramba-Omataka R. (Shortridge).

Described from Lake Chad.

Germain's description of this variety stresses its great length, from 12 to 16 mm., and its very convex whorls and deep suture. The Ovambo series are considerably shorter, only 10 mm., but they agree very well with his figure in all other respects and probably represent a small race of the Chad form.

It is certainly remarkable to find these two extreme varieties living here in company, with practically no intermediates, but in Lake Chad and the quaternary beds of the Fayum several such are found.

With the exception of *Pila wernei* and *V. leopoldvillensis*, all Shortridge's gastropods are in bleached condition, but may not have been dead for long, and probably still inhabit the Omuramba-Omataka River, as it is subject to annual flooding and is only dry for a portion of the year.

FAMILY HYDROBIIDAE.

Genus *Hydrobia* Hartm., 1821.

(=*Paludestrina* d'Orb., 1840.)

Paludestrina was adopted vice *Hydrobia* on the ground that the latter was preoccupied in Coleoptera by *Hydrobius* Leach, 1817, but as the Committee of Nomenclature has ruled that generic names already in existence shall not be invalidated by older ones of *different termination*, Hartmann's name holds good.

Hydrobia aff. *alabastrina* Morel.

1889. *Hydrobia alabastrina* Morel., J. de C., xxxvii, p. 18, pl. ii, fig. 4. D.F.

1926. *Hydrobia* aff. *alabastrina* Morel., Wenz, *loc. cit.*, p. 157. N.

Hab. NAMIB. Chalcedontafelberg (fossil); Klinghardtfeldern 24, S.W. corner (age uncertain, Kaiser and Beetz).

Described from Port Elizabeth.

CLASS PELECYPODA.

FAMILY UNIONIDAE.

Genus *Cafferia* Simps., 1900.*Cafferia caffra* (Krs.).

Ref. List No. 576.

1848. *Unio caffer* Krs., *loc. cit.*, p. 18, pl. i, fig. 14. D.F.1914. „ (*Cafferia*) *caffer* Krs., Simps., Cat. Naiades, p. 574.
D. and synonymy.1922. *Cafferia caffer* Krs., Dgnr., *loc. cit.*, p. 48. N.1925. „ *caffra* „ Conn., Rec., Albany Mus., iii, p. 262,
pl. xii, fig. 2. N.F.*Hab.* GREAT NAMAQUALAND. Stolzenfels, N. bank of Orange River
(Thomsen).

Described from Natal and distributed all over the Union of South Africa and Rhodesia; I refrain from repeating the synonymy published in my Reference List, but may point out that *navigioliformis* Lea, included therein on the authority of Simpson, has since been proved to be a South American *Diplodon*, so plays no part in African conchology.

Genus *Indonaia* Prashad, 1918.*Indonaia kunenensis* (Mouss.).

Ref. List No. 581.

1887. *Unio kunenensis* Mouss., *loc. cit.*, p. 300, pl. xii, fig. 4. D.F.

1914. „ „ „ Simpson, Cat. Naiades, p. 724. D.

Hab. OVAMBOLAND. Kunene R. (Schinz); near Great Falls (Barnard); Okovango R., near Kuringkuru (Dickman); between Dirico and Andara (Staunton); near its junction with Omuramba-Omatoka (Shortridge). Also recorded from Bechuanaland.*I. zambesiensis* (Preston) and *croninae* (Walker) appear to be synonymous with this species, while *U. leopoldvillensis* Putz. must be very nearly allied.

FAMILY MUTELIDAE.

Genus *Aspatharia* Bgt., 1885.(=*Spatha* Auct., non Lea.)*Aspatharia wahlbergi* (Krs.).

Ref. List No. 585.

1848. *Iridina wahlbergi* Krs., Südafr. Moll., p. 19, pl. ii, fig. 1.
D.F.

1914. *Spatha wahlbergi* Krs., Simpson, Cat. Naiades, p. 1326. D.
 1925. „ „ „ Conn., Trans. R. Soc. S. Africa, xii,
 p. 213. N.
 1927. *Spatha wahlbergi* Krs., Schlesch, Arch. f. Moll.-K., p. 200,
 pl. x, fig. 1. N.F.

Hab. OVAMBOLAND. Junction of Omuramba-Omatoka and Okovango rivers (Shortridge).

A single immature example, of unusually high altitude in comparison with its length, dimensions being alt. 38 mm.; long. 65 mm. and crass. 17 mm., but agreeing in all other details with normal.

Described from the Transvaal and recorded from Natal, Zululand, Rhodesia and Lorenzo Marques, this mussel has a wide northward distribution, which is difficult to establish owing to its having been redescribed under several different names; Schlesch figures an example from Nigeria.

Aspatharia sinuata (Mts.).

1883. *Spatha sinuata* Mts., Sitz.-Ber. Ges. Nat. Fr. Berlin, p. 73. D.
 1885. „ „ „ Conch. Mitth., ii, p. 190, pl. xxxiv,
 figs. 5-7. D.F.
 1898. *Spatha cryptoradiata* Putz., Bull. Soc. Mal. Belg., xxxiii,
 p. xxiv, figs. 8, 9. D.F.
 1900. *Spatha sinuata* Mts., Simpson, Proc. U.S. Nat. Mus., xxii,
 p. 899 (check list only).
 1907. *Spatha (Leptospatha) sinuata* Mts., Germ., L'Afr. centr. Fr.,
 p. 557. N.
 1913. *Mutela lukuluensis* Prest., Rev. Zool. Africaine, iii, p. 61,
 pl. vi, fig. 4. D.F.
 1913. *Mutela mathildae* Prest., Rev. Zool. Africaine, iii, p. 61, pl. vi,
 fig. 7. D.F.
 1914. *Spatha sinuata* Mts., Simpson, Cat. Naiades, p. 1333. D.
 1927. *Aspatharia sinuata* Mts. (=lukuluensis and mathildae Prest.),
 P. and B., Bull. Amer. Mus. N.H., liii, p. 417, pl. xxxv, figs. 1-4;
 pl. xxxvi, figs. 1-3a. D.F.
 1928. *Aspatharia sinuata* Mts., Spence, J. of C., xviii, p. 216. L.
 1929. „ „ „ Clench, Bull. Harvard Mus., lxix,
 p. 123. N.L.
 1929. *Spatha sinuata* Mts., Haas, Senckenbergiana, xi, p. 112 (in
 synonymy).

Hab. OVAMBOLAND. Okovango R. (Shortridge).

A. sinuata was described from the Belgian Congo and has been

ground in recording the Ovambo shells under the name that best fits them.

Shortridge collected *I. kunenensis*, *A. sinuata* and *M. mabilli* in sandbanks in the bed of the Okovango close to its junction with the Omuramba-Omataka, where, he writes, he "had to practically dive for them in the sandbanks—keeping a native to look out for crocs all the while"; a good instance of the pleasant risks attendant on scientific research in so many parts of the dark continent.

FAMILY CYRENIDAE.

Genus *Sphaerium* Scop., 1777.

Sphaerium capense (Krs.).

Ref. List No. 593.

1848. *Cyclas capensis* Krs., Südafr. Moll., p. 7, pl. i, fig. 6. D.F.

1922. *Sphaerium capense* Krs., Dgnr., loc. cit., p. 49. N.

Hab. DAMARALAND. Grootfontein (Michaelsen).

GREAT NAMAQUALAND. Seeheim (Michaelsen).

A rare species, only recorded from its original locality, the Knysna District, Cape Province, and near Salisbury, Rhodesia.

Genus *Pisidium* C. Pfr., 1821.

Pisidium ovampicum Ancey.

Ref. List No. 596.

1890. *Pisidium ovampicum* Ancey, Bull. Soc. Mal. Fr., vii, p. 162. D.

Hab. "OMAMBONDE (Ovamboland), Andersson and Chapman."

Neither the type or other authentic examples of this species exist; it appears to have been founded on an unopened specimen, since the only distinctive features in the description are that the sculpture consists of very fine lines of growth, and that the measurements are: diam., $2\frac{2}{3}$; alt., $2\frac{1}{7}$; crass., $1\frac{1}{2}$ mm.

Unless further material, agreeing with the particulars above mentioned, can be collected from somewhere near the vague locality given by the French author, his species can only be regarded as null and void, a just fate for such a slovenly description. The dimensions of *ovampicum* prove it to be distinct from *P. langleyanum* M. and P., from the Cape Province and O.F.S., while they agree almost exactly with those of an undescribed form, which I have seen from the O.F.S. and Transvaal, but in this case the concentric striation is extremely coarse and distant, though quite regular, and could not possibly be termed "very fine," so that it is impossible to accept it as Ancey's species.

TABLE—continued.

[illegible]

(iv) GEOGRAPHICAL NOTES.

In a recent paper on the mollusca of Abyssinia * I pointed out how remarkable is that fauna for its richness and extreme exclusiveness, due to the fact that although situate well within the tropics, Abyssinia has for the most part a temperate climate, is well supplied with lakes and rivers, and is walled in by high mountains from the arid, low-lying regions which surround it.

No one can accuse the similar fauna of South West Africa of richness, but its exclusiveness is quite remarkable, considering that there are no more formidable obstacles north and south than the Kunene and Orange rivers, and that its eastern boundary is, roughly speaking, merely the 20th degree of E. longitude. We must therefore seek an explanation, although not a very satisfactory one, in climatic and geographical conditions.

South West Africa may be divided into seven physical regions, the Namib, Damaraland, the Karst, Ovamboland, Kaokoveld, Great Namaqualand and the Kalahari, but as the Karst, which is the northern district of Damaraland, and the Kalahari have no political status, I have not included either separately in the foregoing records of distribution. Each region has its characteristic climatic and physical features, but there is only a gradual transition from one to the next, and no sharply cut boundary is possible, with the probable exception of that along the southern and western borders of Ovamboland.

The arid stretch of the Namib, which runs along the coast between the Kunene and Orange rivers, comprises a coastal belt of sand with an inland transition zone; here rain seldom falls and there is little or no vegetation. The coastal belt has an average annual rainfall of less than 1 inch, while in the transition zone 3 to 6 inches are registered; the coastal temperature, however, is never high, only rarely rising above 70° Fahrenheit.

The southern area, Great Namaqualand, has in the main an appearance similar to that of Little Namaqualand and the north-west Karroo of the Cape Province, with a dissected border along the Orange River and a mountain belt between it and the Namib. The rainfall is from 4 to 7 inches, but sometimes has been known to drop to 2.6 inches or to rise to 29 inches in various localities; the summer temperature is high and the winters are always severe.

In Damaraland the central plateau reaches its greatest elevation

* P.Z.S., 1928, p. 182.

and the Karroo type of country gives place to park-like grassland studded with large thorn trees, while from it rise several steep and rugged mountain ranges. The average rainfall is from 14 to 16 inches, diminishing southwards and westwards (Rehoboth 9, Karibib 6 and Omaruru 9 inches).

The Karst is an area mainly formed of limestone and dolomite in the north of Damaraland, with its centre around Otavi, a region of deep water-holes, springs, etc., which depend on its predominantly limestone nature. The mean temperature is higher than that of the central plateau and the rainfall heavier; at Tsumeb the average for seventeen years was 22 inches, with a minimum of 12·8 and a maximum of 76·7 inches. Towards the west, however, the average decreases, and in the Kaokoveld is about 12 inches in the east and not more than 1 or 2 in the west, where it merges into the practically waterless Namib sand-belt of the coast.

Ovamboland, however, is a very sharply defined area, at least on the south and west. It is absolutely flat and exclusively sandy, without a mountain, hill, stone, or pebble; rainfall from 24 inches in the east to 16 in the west, but infinitely greater and more reliable than that of the Kaokoveld.

The Kalahari, along the eastern boundary, is but the western strip of the whole Kalahari region which divides the Transvaal from South West Africa. The country is of the type seen in Bechuanaland, grass-covered sand-dunes, with trees and sandy loam in the north and an admixture of Karroo bush in the south. The rainfall is variable, with an average at Hasuur of about 7 inches.

This account of the climate and country, which offers no violent lines of regional demarcation, provides but a meagre solution to the peculiarity of much of its molluscan fauna, of which the salient features are the extremely restricted distribution of certain species, and even genera, in exemplification of which I may mention that the entire genus *Sculptaria*, with one exception, is confined to the territory, in common with the monotypic Pupilloid *Microstele* Bttg., since I hardly think that *Leucochiloides iredalei* Prest. can, as tentatively suggested by Pilsbry, be a true *Microstele*.

Most of the Dorcasiae, as opposed to their southern cousins, the Trigonephri, are only to be found in S.W. Africa, as is the entire genus *Xerocerastus*, with the two exceptions of *burchelli* and *schultzei*, while individuals of other genera confined within its limits include *Gymn. lacrimosus*, *Con. Kaokoensis* and *Ach. tracheia* Conn., *Ach. passargei* Mts., *Ach. schinziana* and *Sub. vitrea* Mousson.

Owing doubtless to the similarity of environment, but noteworthy by reason of the great distance apart, it will be seen that, on first *coup d'œil*, the shells of this territory bear considerable resemblance to those of the deserts of Arabia and North East Africa, while the southern *Xerocerastus* is so near akin to the northern *Zootecus* that it rests with anatomists of the future to determine whether they are identical.

Even more striking is the great dissimilarity between the land snails of S.W. Africa and its immediate neighbour Angola. Not a single terrestrial species recorded from either province is known to inhabit the other; of *Trigonephrus* and all the genera more or less peculiar to S.W. Africa, one species alone, *Sculptaria collaris* (Pfr.), occurs in the Portuguese colony, while of the Streptaxidae, *Limicolaria*, *Opeas* and *Subulina*, which have a strong representation in Angola, S.W. Africa possesses but a single species each of the two last-mentioned genera. It is of course possible that investigation to the immediate north of the Kunene River may help to bridge the gap between the two faunas, but in our present state of knowledge its breadth is truly remarkable.

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FIG.

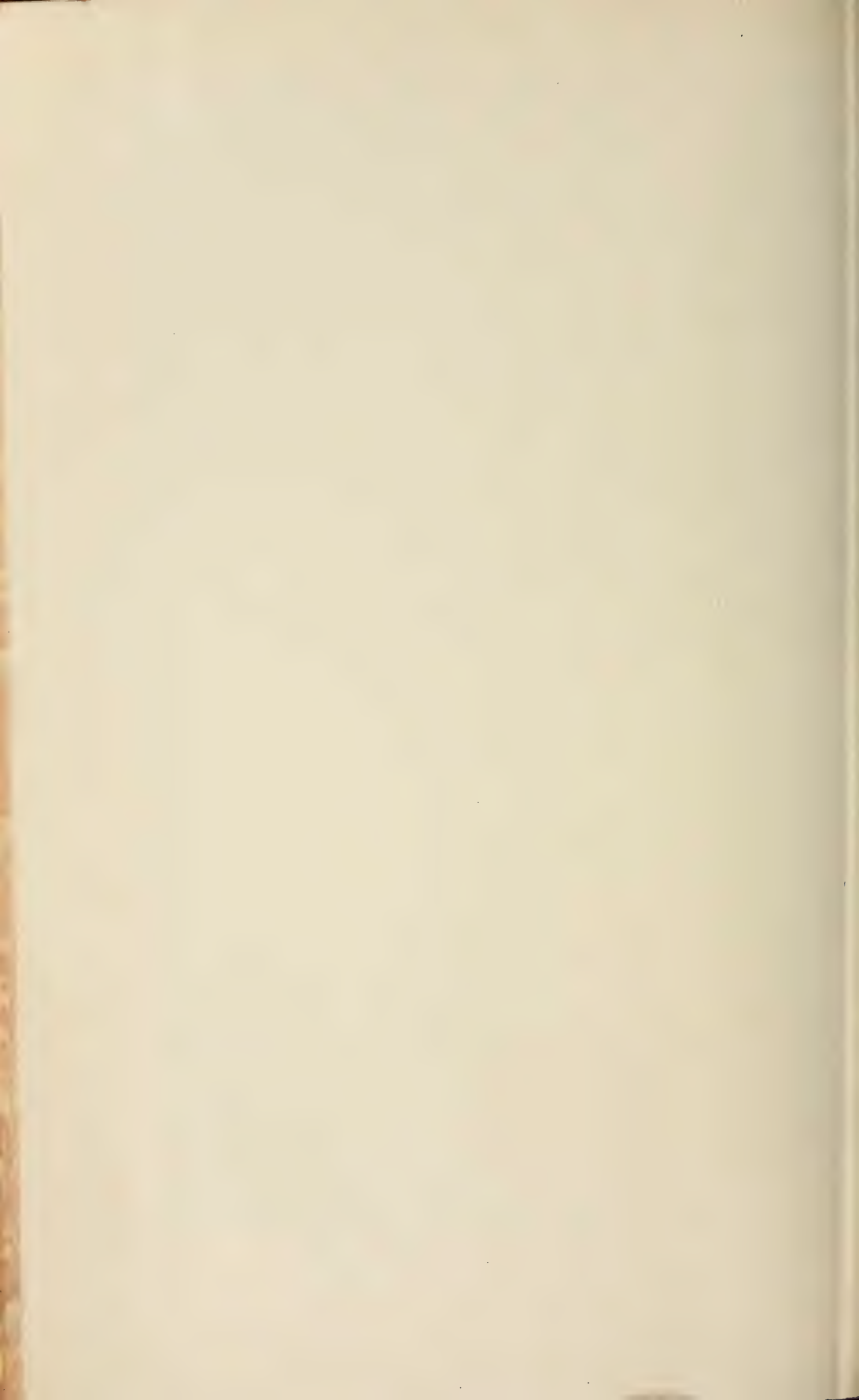
1. *Xerocerastus damarensis* (H. Ad.), forma maxima. Outjo.
2. } *Dorcasia cernua* (Mts.), forma minima. Duwisit.
3. }
4. }
5. *Xerocerastus robustus* (Dgnr.). Otavi Mountain.
6. " *damarensis* (H. Ad.). Usakos.
7. " " " "
8. " " " "
9. " " " var. *minor* Pfr. Onolongo.
10. " " " " " " (juv., = *oppositus* (Mouss.)).
Omuramba-Omatoka R.
11. " *robustus* (Dgnr.). Otjiwarongo.
12. " *burchelli* (Gray). Koegas, Cape Province.
13. " " " Newlands, G. W.
14. " " " identified by O. Boettger as *psammophilus*
(Bttg.). Haruchas Farm.
15. " " " type of *layardi* (M. & P.). Kobis.
16. " *schultzei* (Bttg.). Messina, Transvaal.
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20. " *subteres* (Bttg.). Usakos.
21. " " " Kaoko Otavi.
22. " " " paratype of *rollei* (Haas). Near Naauwklloof.
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25. " *nitens* (Dgnr.), paratype. Otjikoto.
26. *Cleopatra bulimoides* (Oliv.), var. *richardi* Germ. Omuramba-Omatoka R.
27. *Xerocerastus subteres* (Bttg.), forma maxima. Swakopmund.
28. " " " major. "
29. " " " Neineis.
30. " *sericus* (Dgnr.), topotype. Tsumeb.
31. " " " forma major. Otavi Mountain.
32. *Cleopatra bulimoides* (Oliv.), var. *welwitschi* Mts. Omuramba-Omatoka R.

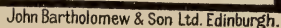
NOTE.—All figures are natural size. The plate contains no new species and all except the last variety have been figured before, so the photographic process was selected as best calculated to portray the variation in certain species in size and form. It has not proved entirely satisfactory in a few cases, however, owing to variation in condition; for instance, in fig. 15 the apex, having retained its dark colour, appears finer than that of the shells on its left; in reality it is quite as blunt as theirs.



MOLLUSCS OF SOUTH WEST AFRICA.

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8. *Reports on the Marine Mollusca in the Collections of the South African Museum.* By J. R. LE B. TOMLIN, M.A.

(With One Text-figure.)

V. THE SCAPHOPODA.

Dentalium subterlineatum n. sp.

SHELL whitish, slender, fairly solid, opaque; strongly and regularly curved throughout, four-angled with more or less of a keel at each angle; lateral areas absolutely flat and smooth; area on the convex side almost smooth, but with some faint traces of longitudinal lineation; concave area marked throughout with distinct longitudinal raised lines, about 10 in number; apical opening almost circular; aperture oblique, quadrilateral, narrowing slightly but regularly from the concave to the convex face.

Length 14 mm.; diam. max. slightly over 1 mm. Hab. Cape Point N. 86° E. 43 miles, 900 fathoms, 2 examples (S.A. Mus., A 6192).

I am doubtful whether these are full grown, but they have such distinct characters that I do not hesitate to describe the species as new.

The nearest form, as far as I can discover, is *D. quadricostatum* Brazier from N.E. Australia, but that is more regularly quadrangular and is quite different in sculpture.

Dentalium strigatum Gould.

Proc. Boston Soc. Nat. Hist. vii, p. 166, Dec. 1859. False Bay.

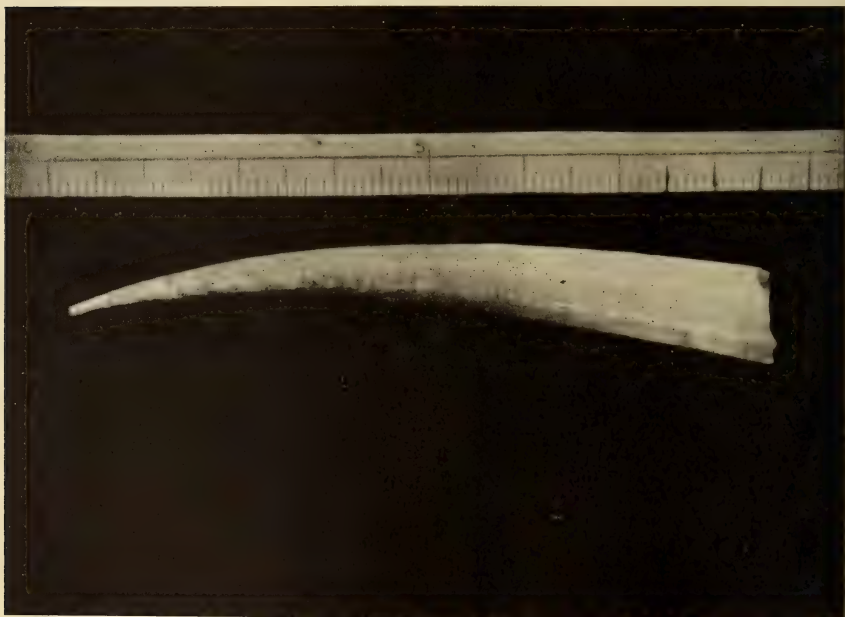
Dentalium belcheri Sowerby, Thes. Conch., iii, p. 101, pl. ccxiv, figs. 28, 29, 1860.

This seems to be the commonest and most widely distributed South African Scaphopod.

Pilsbry is almost certainly correct in assigning the *D. lessoni* Deshayes of Sowerby's "Marine Shells of South Africa," p. 48, to this species. The true *lessoni* of Deshayes came from New Guinea (Lesson).

A recent inspection of the types (3) of *D. belcheri* in the British Museum enables me to place this in the synonymy of *D. strigatum*. Sowerby (*l.c.*) gives the locality of *belcheri* as "E. Indian Archipelago," while the type tablet in the British Museum is labelled "Cape San Antonio" (in Yucatan)! Such a discrepancy is not uncommon in the case of specimens from the Mus. Cuming.

The South African Museum has specimens from Kentani and from 156 fathoms off Lion's Head (dead shells).



A. E. Salisbury, photo.

D. (Fissidentalium) salpinx n. sp.

Dentalium (Fissidentalium) salpinx n. sp.

Shell white, stout and solid, enlarging rapidly, moderately curved throughout its whole length; apex simple; sculpture consisting of about 29 rounded, somewhat flattened ribs, separated by impressed shallow grooves; the ribs become obsolescent towards the broad end over about one-fifth of the length of the shell; they are crossed at right angles throughout by very numerous, fine, close, irregular striae; aperture circular; apex very small with circular opening.

Length 75 mm.; diam. max. 10 mm.

Hab. Cape Point N.E. $\frac{3}{4}$ E. 40 miles, 700–800 fathoms (A 5459), several living.

This splendid species bears a good deal of resemblance to *D. candidum* Jeff. and to *D. ergasticum* Fischer, but may be readily separated by its more regular curvature, its larger aperture, and by the number and character of the ribs.

Dentalium (Fissidentalium) capillosum Jeffreys.

Dentalium capillosum Jeffreys, Ann. Mag. Nat. Hist. (4) xix, p. 153, 1877. The name also occurs as a *nomen nudum* the year before, in Proc. Roy. Soc., xxv, pp. 185, 191, in the "Valorous" Report.

A single example, about 38 mm. long, dead but fresh and perfect, dredged off Cape Natal in 440 fathoms (S.A. Mus., A 3630). This has been carefully compared with "Challenger" shells from off San Miguel (1000 fathoms) of more or less the same size, and is absolutely identical.

D. capillosum has an extraordinarily wide range: I quote the following list of localities from Pilsbry and Sharp's monograph of the Scaphopoda:—

N. of the Hebrides in 542 fathoms; whole N. Atlantic in 208–1785 fathoms ("Valorous" and "Porcupine"); Bay of Biscay, 882 fathoms; coast of Portugal, 220–1095 fathoms; W. of Azores and off San Miguel, 1000 fathoms; Setubal, 470 fathoms; Bahia Honda, 418 fathoms; Culebra Is., 390 fathoms; Havana, 119 fathoms; Martinique, 169 fathoms; near Santa Lucia, 116 fathoms; Barbados, 100 fathoms.

Dentalium (Fissidentalium) platypleurum n. sp.

Shell yellowish white, thin, enlarging slowly; moderately curved at apical end for about a third of the length, the remainder much straighter; apex notched on the convex side; aperture circular, not oblique; sculpture consisting of 32 broad, flat, regular, longitudinal ribs, about twice the breadth of the interstices which separate them, and of numerous fine raised lines which cross interstices and ribs at right angles; these lines can only be detected on the ribs, at the apical end; they seem to have been entirely abraded on the lower two-thirds of the shell, and are only to be traced in the interstices.

Length 31 mm.; diam. max. 3.4 mm.

Hab. off Itongazi River, Natal, 25 fathoms, one live specimen (S.A. Mus., A 3631).

I cannot find any species to which this bears a particularly close

resemblance. The ribbing is remarkably close and regular. The shell has a pinkish tinge almost throughout, but this is due to its thinness and to the presence of the animal inside.

Dentalium (Compressidens) capense n. sp.

Shell whitish, strongly and evenly curved, much flattened, a distinct keel being thus formed on both convex and concave sides; there is also a similar keel on each of the lateral sides, rather nearer to the convex than to the concave keel, and in addition an angular line on either side of the convex keel—between it and the lateral keel; the shell is strongly marked with growth rings; aperture compressed oval, bluntly hexagonal; the apical orifice is imperfect.

Length 16 mm.; greatest diam. of aperture 1.9 mm., least 1.5.

Hab. Cape Point N. 86° E. 43 miles, 900 fathoms, one specimen (S.A. Mus., A 6191).

An interesting addition to the small group of *Compressidens* Pilsbry and Sharp. I believe that this is only the sixth known species: all come from very deep water, though *D. pressum* S. and P. (n. n. for Watson's *compressum* of the "Challenger" Report) was once dredged in 111 fathoms in the Gulf of Mexico.

9. *The Harvest-spiders (Opiliones) of South Africa.*

By R. F. LAWRENCE, B.A., Ph.D., Assistant in Charge of Arachnida.

(With 90 Text-figures.)

THE Opilionid fauna of South Africa as dealt with in this paper is taken to comprise all forms occurring in the South African region, which is that part of the continent below 17° south of the equator ; it consists of the Cape Province, which is redivided into western and eastern portions, Natal and Zululand, Orange Free State and Transvaal, South West Africa, parts of Rhodesia, and parts of Portuguese East Africa. In numbers its 90 species compare with other parts of the world as follows : Europe 232, North America 104, South America 581, Africa (South African region excluded) 201, Australia 38.

Several striking features of the South African fauna must be briefly touched upon. Not a single species has been introduced from other countries by shipping or other means of transport ; in the Myriopod fauna, a largely cryptozoic group, von Attems points out that at least 4 common species, some of them very common, have been introduced and become acclimatised along the coastal strip and even farther inland. No species and only 1 genus (*Rhampsinitus*) of the Opiliones has as wide a distribution in South Africa as, for instance, have certain species of the Palpatores group in Europe such as *Phalangium opilio* and *Opilio parietinus*, which range over Europe, Asia, and North America ; the distribution of *Rhampsinitus* extends from the south of the Sahara to the southern extremity of the continent, but all the 29 species are localised. The South African fauna is again peculiar in that it differs sharply from that of the rest of the African continent ; it shows no relationship at all with that of the Ethiopian region. There is a remarkable development of one of the 3 suborders, the Laniatores, which comprises about 74 per cent. (25 genera, 67 species) of the South African fauna, and in this group there is a marked preponderance of one family, the Triaenonychidae, which consists of 21 genera and 59 species or two-thirds of the total fauna. The fauna of the rest of the African continent is more or less equally

divided between the Laniatores and Palpatores, but there is not a single member of the family Triaenonychidae; this family seems to be limited to the southern continents, Australia, Madagascar, Southern Africa, and South America; its greatest development occurs in Southern Africa, Australia coming next in order, and then South America.

The table given below shows the comparative numbers of species of Laniatores as opposed to Palpatores in the different continents:—

	<i>Laniatores.</i>	<i>Palpatores.</i>
Europe	14 (7 per cent.)	215 (93 per cent.)
North America . .	31 (31 ")	69 (69 ")
Africa	88 (59 ")	81 (41 ")
South Africa . . .	64 (76 ")	21 (24 ")
Australia	33 (87 ")	5 (13 ")
South America . .	555 (95 ")	29 (5 ")

This shows that while the Palpatores attain their greatest development in the northern continents, the undoubtedly more highly specialised Laniatores are most strongly established in the southern ones. In this respect Southern Africa, Australia, and South America are more or less in agreement; Africa shows an equal development of both groups owing to its Mediterranean seaboard sharing a number of widespread palaearctic species of Palpatores with the Mediterranean countries and Northern Europe. In one respect the fauna of South Africa differs from that of Australia and South America; no members of the peculiar primitive suborder of Cyphophthalmi have as yet been found in the two latter continents while 2 species are found at the southern extremity of Africa; 3 species are found in tropical Africa.

Since all the South African genera except *Rhampsinitus* are endemic it cannot be said that there is any striking resemblance to any other region, though taking the group as a whole there is a greater relationship with the other southern continents Australia and South America than with the geographically more closely allied Ethiopian region. With regard to the relationships of individual members, the unique family of Acropsopilionidae, in which the eyes show enormous development of size, has hitherto been represented only by a single species from Chile; a member of this family, *Oonopsopilio*, from the south-

western corner of South Africa is undoubtedly allied to it. The east coast of South Africa shows undoubted relationship to Madagascar in 1 species of the genus *Acumontia* which had been hitherto supposed to be confined to the island; in the Assamiidae, a family containing most of the Laniatores of tropical Africa, 2 more or less subtropical genera *Namutonia* and *Cryptopygoplus* from South West Africa reveal affinities which link up the South African and Ethiopian regions.

Though many additions will have to be made to the list of Opilionids in South Africa, the Western Cape Province, especially the Cape Peninsula, is comparatively well known; in this respect the eastern half of the Cape Province comes very near to it except those parts between the east of Grahamstown and Natal. Natal and Zululand are but little known and will repay more detailed investigation; the other provinces—Transvaal, Orange Free State, Rhodesia, and South West Africa—are hardly known at all; the following table shows the number of genera and species recorded from the various provinces:—

	W.C.P.	E.C.P.	Natal, Zulu- land.	Trans- vaal, O.F.S.	Rhod.	P.E.A.	S.W.A.
Species . . .	44	31	9	6	3	2	4
Genera . . .	20	13	5	2	3	2	4
Endemic genera	13	5	2	0	0	0	1

The Western Cape shows the greatest number of endemic genera, and this number decreases eastwards; the only 2 species of the small suborder of Cyphophthalmi living in South Africa are found in the Western Cape; the whole family of Triaenonychidae with its 2 subdivisions is confined entirely to the southern provinces, although with more detailed exploration some species are bound to be discovered in the northern ones; at present only 1 genus of Opilionid is found in the northern provinces that also occurs in the southern ones—*Rhampsinitus*; the lack of exploration in the northern provinces is well illustrated by the fact that the Opilionid fauna of the whole area covered by the Transvaal, Orange Free State, and Basutoland is represented by this single genus.

In the Cape Province certain small areas seem to be especially rich in Opiliones; on Table Mountain and its slopes are found no

less than 20 species representing all 3 suborders and all the families except 1 that occur in South Africa; Knysna represents another rich locality with 10 species, Grahamstown has 9, the Hogsback, Amatola Mountains, 5 species.

Unfortunately practically nothing is known of the habits and life-histories of South African harvest-spiders; they are in one respect a group easy to collect, for when their hiding places are revealed they make no effort to escape, and even when touched or taken with forceps remain inert; all the South African forms are slow-moving and for that reason are difficult to detect, especially when, as in all the Adaeinae, they are covered with a thin layer of dirt and grit, which together with the dry-twigg appearance of their appendages make them almost invisible against a gnarled log or earth-covered stone. The long-legged Palpatores of Europe, such as *Opilio*, evidently differ in their habits from our *Rhampsinitus*; the Palpatores of the older countries seem able to move with more rapidity, and occasionally also enter houses, neither of which can be said of our Palpatores; it is possible that as a country becomes more densely populated the habits of these animals may be modified and that in Europe the entry of these arachnids into human dwellings accounts for the wide distribution of one or two species; this is also the case in some spiders such as *Tegenaria* and *Pholcus*. At Hermanus all specimens of *Rhampsinitus littoralis* were found under rusty tins and rotting wooden boxes among the scrub near the shore, a habitat rather unusual for the genus.

In this paper the main lines of classification set out by Dr. C. F. Roewer in his comprehensive and valuable monograph, *Die Weberknechte der Erde*, have been adhered to. My best thanks are due to the author for allowing me to reproduce his descriptions of new species which had already gone to press. The present paper is based mainly upon the collection in the South African Museum accumulated through many years by the late Dr. W. F. Purcell; of very great assistance has been the material of the Albany Museum, Grahamstown, the loan of which is due to the kindness of its Director, Mr. J. Hewitt; the work of Dr. G. Rattray and the Rev. R. Godfrey, who have collected much fine material in the Eastern Province, has been of great value. Thanks are also due to the Directors of the Transvaal and Natal Museums for the loan of their collections.

ORDER OPILIONES.

The Opiliones fall into 3 suborders which can be distinguished as follows :—

1. Openings of the odoriferous glands situated on a conical tubercle on the dorsum of the carapace (fig. 1, *a*); genital opening exposed, not covered by an operculum (fig. 1, *h*) A. Suborder *Cyphophthalmi*, p. 345.
 Openings of the odoriferous glands not situated on a tubercle but at the sides of the carapace; genital opening covered by a movable operculum (fig. 11, *A*) 2.
2. Pedipalps powerful, the tarsus provided with a stout grasping claw (fig. 26, *f*); terminal segment of tarsi I and II with 1 simple claw, tarsi III and IV with 2 claws or a trifurcate claw (fig. 16, *c*) . . . B. Suborder *Laniatores*, p. 351.
 Pedipalps slender, antenniform, the tarsus with or without a weak claw (fig. 79); terminal segments of all tarsi with 1 simple claw
 C. Suborder *Palpatores*, p. 468.

A. SUBORDER CYPHOPHTHALMI Simon.

1923. Die Weberknechte der Erde, C. Fr. Roewer, p. 41.

1904. Two Orders of Arachnida, Hansen and Sorensen, p. 86.

Eyes usually absent (always in South African forms), if present widely separated from each other; openings of the odoriferous glands at the apices of conical tubercles situated on the carapace above the interval between coxae II and III (fig. 1, *a*); pedipalps slender, antenniform, the tarsus with a minute terminal claw (fig. 1, *c*); maxillary lobe of coxa I itself immovable but movable together with the coxa, its chitinous portion not divided; maxillary lobe of coxa II distinct, either movable or only slightly movable together with the coxa; labium absent; sternum either small and triangular or absent (fig. 1, *h*); coxa I movable, coxae III and IV always immovable and fused with each other, coxa II movable or fused with coxa III; leg I longer than II, legs II, III, and IV hardly movable between metatarsus and tarsus; claws of tarsi of legs I–IV simple, not serrate (figs. 1, *d*, *e*); abdomen dorsally consisting of 9 complete and distinct tergites without the anal operculum, and ventrally of 9 sternites; genital opening exposed, not covered by an operculum (fig. 1, *h*); secondary sexual characters present in tarsus IV and in the region of the genital opening, tarsus IV of ♂ with a dorsal process concealing the canal of a gland (fig. 1, *e*), this absent in the ♀; genital aperture in the ♂ hardly longer and usually shorter, in the ♀ many times longer than the distance between genital aperture and coxa III.

One family.

FAM. **SIRONIDAE** Simon.

Two subfamilies.

1. I coxa movable, II, III, IV coxae fused and immovable; maxillary lobes of coxa II longer than broad; second segment of chelicera with a medial row of fine hairs Subfam. *Stylocellinae*.
 I and II coxae movable, III and IV coxae fused and immovable; maxillary lobes broader than long; second segment of chelicera with only 1 minute medial hair Subfam. *Sironinae*.

The *Stylocellinae* are not represented in Southern Africa though two genera, *Ogovea* and *Parogovia*, occur in Equatorial Africa.

SUBFAM. **Sironinae** Hansen and Sorensen.

Two genera and two species in South Africa.

Key to genera.

1. Odoriferous glands about 6 times as far from each other as from the lateral edge of carapace; tergites closely covered with bead-like granules; trochanter of pedipalp with an inferior process *Purcellia*, p. 346.
 Odoriferous glands 2-3 times as far from each other as from the lateral edge of carapace; tergites smooth or with a few very small granules; trochanter of pedipalp without an inferior process *Speleosiro*, p. 348.

Gen. **PURCELLIA** Hansen and Sorensen.

1904. Hansen and Sorensen, Two Orders of Arachnida, p. 105.

Eyes absent; odoriferous tubercles (fig. 1, *a*) short, rounded, their basal diameter about a half their distance from the lateral margin of the carapace; chelicerae as in fig. 1, *b*; pedipalp as in fig. 1, *c*, the trochanter with an inferior process; coxa I hardly broader than II and III, about a half as broad as coxa IV; sternum minute; tarsi of legs I-IV one and a half to twice as long as their metatarsi; hair pad absent in tarsus I; tarsi I and II not longitudinally sulcate above; tarsal claws of legs I-IV simple, not serrated; tarsus IV of ♂ 2-jointed, of ♀ 1-jointed.

One species, Cape Province, South Africa.

Purcellia illustrans Hansen and Sorensen.(Text-fig. 1, *a-h*.)

1904. Hansen and Sorensen, Two Orders of Arachnida, p. 106, pl. iii, figs. 4, *a-c*; pl. iv, figs. 1, *a-c*.

We have in the Museum's collection specimens from the following localities in the Cape Peninsula: Newlands, Table Mountain above

Klassenbosch, Grotto Ravine, Platteklip, Devil's Peak, Nordhoek ;
new locality records are : Stellenbosch, Houwhoek (Caledon division),

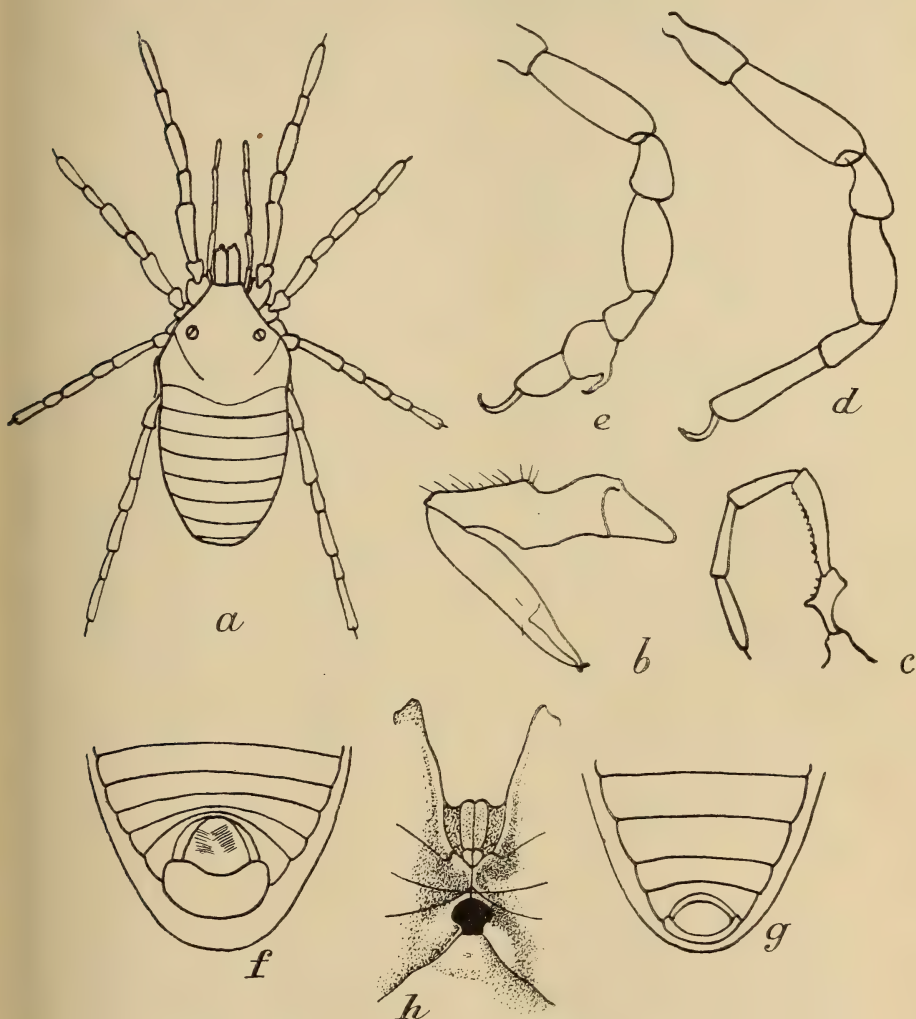


FIG. 1.—*Purcellia illustrans*. ♂: *a*, dorsal surface; *b*, chelicera; *c*, palp; *e*, tarsus IV; *f*, corona analis. ♀: *d*, tarsus IV; *g*, corona analis; *h*, genital opening. (Copied from Hansen and Sorensen.)

Knysna ; specimens from the last three localities agree in all respects with those found on Table Mountain. The habitat of this species is typically cryptic, being always found in damper parts such as ravines

and kloofs where mould is apt to collect; it lives in damp, decaying leaves or in soil containing a large percentage of vegetable detritus. Hansen and Sorensen in their general account of the Cyphophthalmi describe certain peculiar hairs in this species to which they ascribe a sensory function (*loc. cit.*, p. 36) and also lyriiform organs (*loc. cit.*, p. 41).

Gen. SPELEOSIRO n. gen.

Body flattened and oval, pointed posteriorly and anteriorly, more so posteriorly; body quite distinctly larger than in *Purcellia*, its length $1\frac{2}{3}$ the breadth (in *Purcellia* it is almost 2); chelicerae strongly compressed laterally, length of segment I measured *in situ* from the anterior margin of the carapace $1\frac{1}{2}$ times the distance of the odoriferous glands from the anterior margin of the carapace (in *Purcellia* these distances are about equal); odoriferous glands, when viewed from above, 2-3 times as far apart as they are from the lateral margin of the carapace; in *Purcellia* they are about 6 times as far apart as from the lateral margin of the carapace; granulation differing from *Purcellia* as follows: carapace wrinkled and leather-like, with some moderate granules; tergites, especially those posteriorly, smooth, provided with a few small scattered granules; coxae and sternites with more numerous regularly placed small granules, a little larger than those of the tergites; seen with the naked eye the dorsal surface, especially of the abdomen, is smooth and shiny; in *Purcellia* the granules are much larger, bead-like, and closely packed all over the dorsal and ventral surfaces. Pedipalps longer and more slender than in *Purcellia*, the trochanter without an inferior process. Otherwise as in *Purcellia*.

One species, in caves, Table Mountain.

Speleosiro argasiformis n. sp.

(Text-fig. 2, a-d.)

♀. *Colour*.—Dorsum dark brown, the posterior and anterior apices and a marginal border light brown, appendages light brown. Granulation of body as in generic description. Odoriferous tubercles low conical structures, flattened at the top, broader at the base than high, and situated a little nearer to the posterior than to the anterior margin of the carapace, the apertures of the glands opening upwards and a little backwards, a few setae near the tip of the tubercle.

Tergites and sternites as in description of family characters, 8 tergites visible from above as in fig. 2, a; corona analis as in fig. 2, b.

Pedipalp as in fig. 2, *d*, the segments long and slender, trochanter without process but its inferior distal portion and the whole of femur inferiorly with fine granules; femur and trochanter sparsely clothed

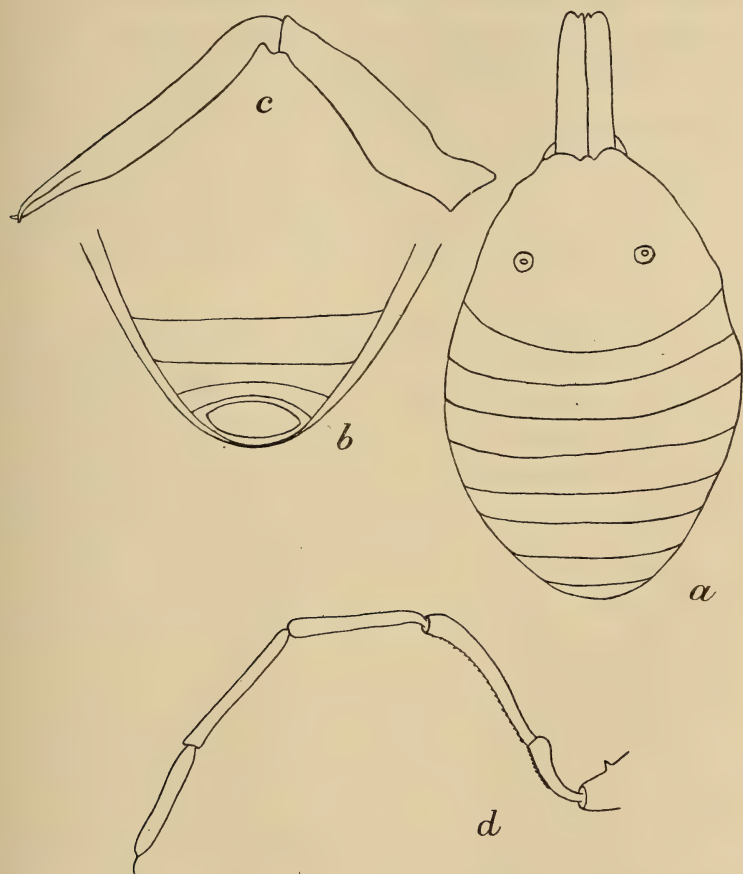


FIG. 2.—*Speleosiro argasiformis*. ♀: *a*, dorsal surface; *b*, corona analis; *c*, chelicera; *d*, palp.

with upright setose hairs; patella, tibia, and tarsus with similar hairs but with a scopula of much shorter, spine-like hairs as well; these, especially on the tarsus, far more numerous than the setose hairs, almost prone and slightly curved.

Chelicera as in fig. 2, *c*, strongly flattened from side to side, slender, movable finger of second segment with about 16 small simple conical teeth followed by 5 larger bicuspid teeth, these decreasing in size

distally; immovable finger with only 7-8 teeth of the bicuspid type; the simple teeth of the movable finger equal in size and quite differentiated from the following 5 molariform teeth; first segment covered with very small scattered granules, a row of short hairs along its dorsal surface, second segment smooth with 2 short setae on its dorsal surface, 1 a little anterior to the middle and 1 just before the insertion of the movable finger; second segment longer than first segment.

Genital opening much as figured by Hansen and Sorensen in the description of *Purcellia illustrans*, Two Orders of Arachnida, pl. iv, fig. 1, *j*; the arculi genitales, however, are larger and project farther inwards and forwards over the genital opening, appearing to be almost distinct and detached from the coxa; they are provided at their tips with some curved setose hairs.

Legs.—All tarsi with 1 segment; I tibia $1\frac{2}{3}$ as long as patella; I tarsus $1\frac{1}{2}$ times as long as metatarsus and 5 times as long as broad, seen from the side; all segments of leg I except tarsus with both long curved fine-pointed hairs and short hairs; tarsus with a dorsal strip of long curved pointed hairs and a row of 7 modified hairs, these shorter, regularly curved and with blunt tips, corresponding to the modified sensory hairs described in *Purcellia* and other genera by Hansen and Sorensen (*loc. cit.*, p. 37); ventral surface and sides of tarsus with no long hairs but with a brush of very fine, short, close-set hairs.

Measurements.—Total length with chelicerae removed 4.7, greatest breadth 2.9; I leg 7.8; chelicera: I segment 2, II segment 2.5 mm.*

Type, 1 adult female.

Additional specimens, 2 subadult females.†

The subadult specimens are distinctly larger in size than adults of *Purcellia*; they differ from the type in being more granular on the carapace and anterior tergites, especially in the middle; the last 5 tergites seen from above are quite smooth; tergites with a narrow black margination posteriorly, the general colour of the body a dirty olive green; genital aperture closed.

Measurements.—Total length 3.7-4, greatest breadth 2.4-2.5. Total length of largest subadult, including chelicerae, 5.2 mm.

These 3 specimens were found in the Wynberg Cave of Table Mountain, one by Dr. K. H. Barnard in 1913, the other two by myself in May 1929. The cave occurs at the top of the mountain in the

* In any further descriptions, unless the contrary is stated, the total length is taken to mean the distance from the posterior apex of abdomen to the anterior border of the carapace, the chelicerae having been removed.

† For description of male see Appendix, p. 503.

Table Mountain sandstone; the entrance to the caves is tortuous and narrow, and the main body of it where the specimens were found is about 100 feet below the surface, the possibility of any light reaching it being thus precluded; the walls of the main cave are damp and slimy from the water which constantly percolates through fissures in the rocks; the specimens were found under small stones on very damp or even wet sand. The only vegetation seems to consist of a small lichen and the fauna is sparse, the chief representative being the peculiar Acridiid Orthopteron, *Speleiacris tabulae*; another peculiar animal inhabiting the cave is a blind and unpigmented Peripatus, *Peripatopsis alba*. Outside at the mouth of the cave were found specimens of *Purcellia illustrans* in the usual habitat.

B. SUBORDER LANIATORES Thorell.

1923. Die Weberknechte der Erde, C. Fr. Roewer, p. 55.

1904. Two Orders of Arachnida, Hansen and Sorensen, p. 85.

Two eyes present, usually placed one on each side of a tubercle in the middle of the carapace (Subfam. *Adaeinae*, fig. 58, *a*) or widely separated from each other on the surface of the carapace (Subfam. *Biantinae*, fig. 3, *a*); openings of odoriferous glands not situated on a conical tubercle but near the sides of the carapace above the anterior margin of coxa II; tergites of prosoma not demarcated from each other, fused into a carapace without dividing grooves (fig. 10, *a*); abdomen with 8 tergites, excluding the last the so-called anal operculum, of these tergites only the last 3 free, the first 5 being fused with the carapace to form a single dorsal scute where they are recognisable as I-V or I-IV (where still greater fusion has taken place) areas, these areas may be defined by transverse grooves (fig. 10, *a*); abdomen with 9 sternites, of the first of which only traces are present (arculi genitales), II and III being fused into the stigma-bearing sternite, VIII and IX completely fused into a broad sternite lying in front of the anal opening (fig. 11, *A*); genital opening covered by a movable operculum (*g.o.*, fig. 11, *A*); pedipalps powerful, modified for grasping, tibia and tarsus at least with long seta-tipped spines or with teeth provided laterally with setae (fig. 26, *f*), tarsus with a long powerful terminal claw which at rest can be folded against its under surface; labium distinct, soft; sternum long, narrowed, seldom widening posteriorly (fig. 43); coxa I movable, remaining coxae immovable and fused with each other, coxa IV sometimes strongly developed; leg I shorter than leg II, metatarsus of legs I-IV sometimes (all

Triænonychidae) divided into a basal astragalus and apical calcaneus, these being immovable with respect to each other (fig. 11, *B*); in all South African forms of Triænonychidae with a few exceptions the calcaneus is very much shorter than the astragalus; terminal claws of tarsi I and II always simple and single, those of III and IV usually double or with 3 prongs (trifurcate) (fig. 16, *c*); penis usually long, thin and without muscles, occasionally short, thick and muscular (Triænonychidae); ovipositor short, more or less soft skinned, not annulate; secondary sexual characters of ♂ strongly developed in the armature not only of the body but also of the legs and pedipalp; tarsi of legs divided into a variable number of segments which in legs I and II fall into 2 sections which occasionally consist of 1 but usually of more segments, in legs III and IV the tarsi fall into 3 sections, a basal section with several segments, a median always consisting of 1, and an apical consisting always of 2 segments bearing the 2 claws or trifurcate claw; above these claws the tarsus is sometimes prolonged into a pseudonychium or false claw; the divisions between the sections of the tarsus in adult animals always remain deeper and more distinct than those between the segments which themselves compose the sections; metamorphosis either slight or quite distinct.

The suborder is divided into 6 families.

Key to families of Laniatores.

1. The last 4 tergites free and not coalesced 2.
Only the last tergite, the operculum anale, freely movable, remaining tergites coalesced to form a dorsal scute *Oncopodidae*.
2. III and IV tarsus with 2 true claws, these simple or serrated 3.
III and IV tarsus with 1 trifurcate claw in adults (fig. 16, *c*), or in juveniles with 1 claw which bears a variable number of small lateral teeth
Triænonychidae, p. 366.
3. Pedipalps carried crossed over in the region of the patellæ, with weak armature; inferior frontal margin of carapace with 5 (2:1:2) forwardly projecting conical teeth (fig. 5, *g*) *Assamiidae*, p. 357.
Pedipalps not carried crossed over but directed forwards; inferior frontal margin of carapace, although sometimes drawn out into sharp angles at the sides and centre, not armed with 5 conical teeth (fig. 42, *b*) 4.
4. III and IV tarsus each with a pseudonychium 5.
III and IV tarsus without a pseudonychium *Phalangodidae*, p. 353.
5. Pedipalps weak, the femur tibia and tarsus broadly flattened and keeled, all segments of pedipalp unarmed, not strongly spined *Cosmetidae*.
Pedipalps strong, the femur not flattened, tibia and tarsus stout and rounded, at most only flattened ventrally between the strong spines of tibia and tarsus *Gonyleptidae*.

Three of these families are found in South Africa, the *Phalangodidae*, *Assamiidae*, and *Triakenonychidae*. The *Oncopodidae* is a small family confined to South-East Asia, while the *Cosmetidae* and *Gonyleptidae* occur in South America and the southern part of North America.

FAM. **PHALANGODIDAE** Simon.

For a summary of the family characters see :

1923. Die Weberknechte der Erde, C. Fr. Roewer, p. 64.

The family has a practically world-wide distribution; 3 subfamilies occur in Africa.

Key to subfamilies of Phalangodidae.

1. Femur of leg I not spined 2.
Femur of leg I spined *Erecananinae*.
2. Eyes raised on a distinct tubercle, pedipalps short and stout, III and IV tarsus without a scopula *Phalangodinae*.
Eyes not raised on a tubercle but placed wide apart on the carapace (fig. 3, a); pedipalps very long and slender (fig. 3, b), III and IV tarsus with a thick scopula *Biantinae*, p. 353.

Of these only the *Biantinae* occur in South Africa. The *Phalangodinae* is much the largest subfamily, consisting of about 40 genera distributed throughout the Old and New Worlds; of these 3 are found on the Guinea coast of West Africa, 1 in British East Africa, and 1 in the Seychelles. The *Erecananinae* is a small subfamily consisting of 2 genera, one of which is found in Java (*Lomanius*), the other (*Eerecanana*) in East Africa.

SUBFAM. **Biantinae** Roewer.

1923. Roewer, Die Weberknechte der Erde, p. 128.

The subfamily contains 10 genera, most of which are African; 1 genus, *Metabiantes*, is found in South Africa.

The genus *Spinibiantes* was created for Pocock's species *Hinzuanus leighi* by Roewer, 1915, Arch. Naturg., lxxxi, A, fasc. 3, p. 177. The generic descriptions as given by him in Die Weberknechte der Erde, pp. 133-140, for *Metabiantes* and *Spinibiantes* are, however, almost word for word identical, the only character really differentiating the two being the presence in *Spinibiantes* of a pair of median spines (*Dorn-Paar*) on the III and IV areas of the dorsal scute, while in *Metabiantes* these are absent with the exception of two tropical species, *filipes* and *jeanneli*, in which these areas bear enlarged granules

(*Körnchen*). In the specimens of *Metabiantes* (*Spinibiantes*) *leighi* I have examined, from Port Shepstone, Natal, Zululand, etc., these spines or teeth vary from a small size hardly larger than the surrounding granules to distinctly defined sharp teeth which are quite noticeably prominent; the only character then which separates *Metabiantes* from *Spinibiantes* is the size of the teeth or enlarged granules on the III and IV areas, and this itself is a variable character. It seems highly probable that *Spinibiantes leighi* and *Metabiantes jeanneli* from East Africa are related or even that *jeanneli* is only a variety of *leighi*. I therefore propose to drop the genus *Spinibiantes* and to include its 1 species, *S. leighi*, in *Metabiantes*; from a survey of the 70 odd specimens in the collection of the Museum it appears that the whole genus *Metabiantes* is a homogeneous one with few characters that sharply divide the species, some of those used in Roewer's key being of little diagnostic value; the sigmoid curvature of the IV femur, for instance, is a character of doubtful specific value, there being a certain but variable amount of curvature in all specimens I have examined.

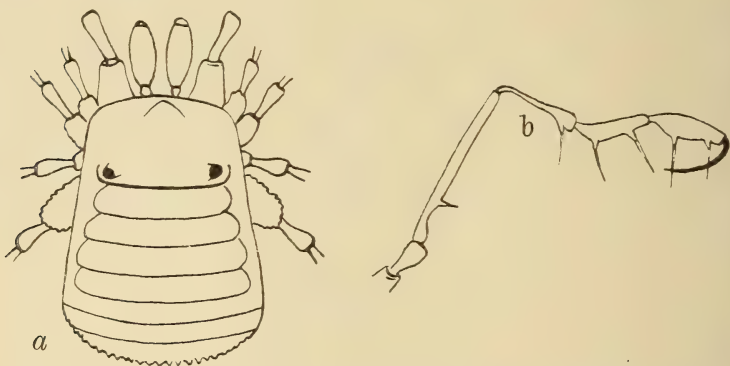


FIG. 3.—*Metabiantes*. a, dorsal surface (granulation not shown); b, palp. (Copied from Roewer.)

Gen. METABIANTEs Roewer.

(Text-fig. 3, a-b.)

1923. Die Weberknechte der Erde, C. Fr. Roewer, p. 133.

Frontal margin of carapace in the middle with or without a low rounded process; dorsal scute divided by transverse grooves into 5 areas, the III and IV of which may be armed with a median pair of

enlarged granules or teeth; stigmæ hardly visible; chelicera with segment I swollen dorsally at its distal extremity; pedipalp: femur with 1 spine inferiorly in its basal third, patella with 1 spine inferiorly near distal apex, tibia and tarsus with 2 spines on each side inferiorly; legs with tarsal segments I, 3; II, 5; III, 5; IV, 5; secondary sexual characters developed in leg II or IV.

Four species, confined to the eastern half of Southern Africa.

Key to species.

1. Areas I-IV closely and irregularly granular with no transverse row of enlarged granules *meraculus*, p. 355.
Areas I-IV closely and irregularly granular with either a transverse row of enlarged granules, or areas III and IV with a pair of distinct median spines 2.
2. Areas III and IV with a median pair of enlarged tooth-like spines *leighi*, p. 356.
Areas III and IV without a median pair of tooth-like spines but with a transverse row of slightly enlarged granules, these sometimes limited to a median pair 3.
3. Femur of pedipalp below with 2 spines near its base (fig. 4, c), segment I of chelicera uniformly granular above (fig. 4, b) *maximus*, p. 356.
Femur of pedipalp below with 1 spine near its base, segment I of chelicera more or less smooth above *pusulosus*, p. 355.

The South African species as distinguished above are not very clear-cut forms; the species tend to grade into each other.

Metabiantes meraculus Loman.

1898. Loman., Zool. Jahrb. Syst., ii, p. 522.

One specimen which appears to belong to this species, the label bearing the words "no history"; there is, however, no seta (*borst*) in the anterior third of the femur of either this or any other specimen of *Metabiantes* in the collection of the South African Museum.

Metabiantes pusulosus Loman.

1898. Loman., Zool. Jahrb. Syst., ii, p. 522.

The South African Museum has specimens from Doornek, Alexandria Division (5 individuals); Knysna (8); Dunbrody, Uitenhage Division (3); Grahamstown (11); Kaapmuiden, E. Transvaal (3); Addo Bush (1); Inchanga, Natal (1); Rietvlei, Umvoti District (1); Krantskop, Natal (3); Pietermaritzburg, Natal (1). The Albany Museum, Grahamstown, has it from Blytheswood (8); Alicedale (7);

East London (1); Grahamstown (1); Somerville (10); Port Alfred (5); Hogsback, Amatola Mountains (1).

Metabiantes leighi Pocock.

Hinzuanus leighi.—Pocock, Proc. Zool. Soc., pt. 2, p. 412 (1902).

Spinibiantes leighi.—Roewer, Die Weberknechte der Erde, p. 140.

The South African Museum has specimens from Umtata (1); Manubie Forest (1); Kentani (6); East London (1); Durban (6); Delagoa Bay (3); Amanzimtobi, Natal (1); Mfongosi, Zululand (5); Port Shepstone (5); Masiene, near Limpopo River (2); Krantzkop, Natal (1); Port St Johns (1). The Albany Museum, Grahamstown, has it from East London (11).

Metabiantes maximus n. sp.

(Text-fig. 4, a-c.)

Colour.—Yellow-brown.

Carapace, dorsal scute, tergites closely and uniformly covered with shiny round granules; carapace with granules smaller than those on the remainder of dorsum; anterior lateral angles of carapace with a row of about 9 small granules; areas I-IV well defined, with 1 or 2 seta-tipped granules in the middle a little larger than the rest but with no definite row of enlarged granules; area V with a row of granules definitely a little larger than remaining granules, free tergites I and II with 1 row of slightly enlarged granules their anterior thirds matt, free tergite III covered with granules but without an enlarged row; dorsal scute with 2 lateral rows of granules, the outer one regular the inner a little less so; sternites with 2 distinct rows of small granules at the sides, these rows hardly visible in the middle; inferior surfaces of coxae with scattered granules, coxa III with an anterior and posterior row of distinct reddish granules.

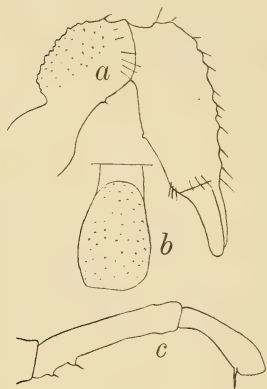


FIG. 4.—*Metabiantes maximus*. a, chelicera from the side; b, segment I of chelicera from above; c, femur and patella of palp.

Pedipalp as in fig. 4, c, femur below near the base with 2 spines, these smaller than in other species, patella below with an apical spine weaker than in other species, remaining segments as in other species;

chelicera large and strong (figs. 4, *a*, *b*), segment I above regularly but not thickly covered with small granules, seen from the side as in fig. 4, *a*, anterior surface of segment II with an irregular row of low rounded granules. Legs: II and IV stronger and longer than I and III, tibia and metatarsus of II without a row of small sharp granules (female ?); tarsal segments 3 : 5 : 5 : 5.

Measurements.—Length of body 4·2, chelicerae I+II, 1·5+2·2, pedipalps (trochanter-tarsus) 4·2 mm.

Type, 1 ♀, Somerville, Eastern Cape Province. Type in Albany Museum, Grahamstown.

FAM. **ASSAMIIDAE** Sorensen.

For a summary of the family characters see :

1923. Die Weberknechte der Erde, C. Fr. Roewer, p. 215.

Three subfamilies are known, two of which—the *Trionyxellinae* and *Assamiinae*—occur in the South African region.

Key to subfamilies.

1. III and IV tarsus with a pseudonychium (fig. 5, *e*)

Subfam. *Trionyxellinae*, p. 357.

III and IV tarsus without a pseudonychium Subfam. *Assamiinae*, p. 360.

SUBFAM. **Trionyxellinae** Roewer.

1923. Roewer, Die Weberknechte der Erde, p. 215.

Two tropical West African genera, *Pungoica* Roewer and *Pungoiella* Roewer, belong to this subfamily; only one genus, *Namutonia*, is found in the South African region.

Gen. **NAMUTONIA** n. gen.

Tarsi III and IV with large blunt spur-like pseudonychium, claws simple (fig. 5, *e*). Tarsi I and II with each 3 segments, tarsi III and IV with each 4 segments. Ocular tubercle low, the eyes far apart (three times their largest diameter) and surrounded by a pigmented area; tubercles of body themselves covered with fine granules; femur of pedipalp armed with 5 strong teeth below; legs unarmed.

One species—South West Africa.

Namutonia scabra, n. sp.(Text-fig. 5, *a-g*.)

Body yellow, eyes surrounded by black rings (fig. 5, *c*, seen from above and a little from behind); area surrounding ocular tubercle with fairly dense and irregular tubercles; tubercles of body of different sizes, the 5 (2:1:2) on the lower frontal margin of the carapace much the largest and conical (fig. 5, *g*); next in size are the tubercles constituting the enlarged transverse rows of the free tergites, then those of the fused area; all tubercles themselves covered with fine granulation and tipped with a seta which usually projects backwards and mesially, the interspaces of the tubercles filled up with minute granules but these much less dense than on the areas described as "matt." Ocular tubercle seen from the side as in fig. 5, *d*; dorsal scute divided into quite well-defined areas thickly covered with tubercles arranged in 2 or 3 rather irregular transverse rows, the interspaces filled with smaller tubercles; lateral borders of fused area with smaller tubercles; I and II free tergites with their anterior halves occupied by 2 rows of tubercles the anterior of which is composed of small, the posterior of large tubercles; their posterior halves devoid of tubercles but with fine matt granulation; III free tergite with tubercles arranged in more or less irregular rows, more than 3 deep, the posterior ones largest. Sternites with their anterior $\frac{2}{3}$ forming a thickly tuberculate band, the tubercles homogeneous in size and smaller than those of the tergites; remaining posterior $\frac{1}{3}$ with matt granulation; all coxae below thickly covered with small tubercles, IV with 3 club-shaped tubercles along posterior distal margin and 3 smaller anterior ones more proximally situated, II with 3 club-shaped tubercles at posterior distal apex, the anterior margin bordered with a row of enlarged tubercles, I with a tricuspid tubercle along lower anterior margin in the middle; genital operculum matt, with a few granules.

Pedipalp seen from the outer side as in fig. 5, *a*; trochanter with 1, femur with 5 strong teeth below with accessory lateral setae; femur with a strong spine-like tooth at its inner distal apex (not seen in fig.) which projects horizontally at right angles to the longitudinal axis of femur; patella with 1 (2) outer, and 2 strong inner teeth; outer side of tibia spined as in fig. 5, *a*, inner side with 3 small spines alternating with 2 much longer ones; inner side of tarsus spined as in outer side; chelicera with first segment as in fig. 5, *f*. Tarsal segments I, 3; II, 3; III, 4; IV, 4; terminal segment of tarsus IV with pseudonychium as in fig. 5, *e*; pseudonychium of tarsus III considerably smaller than in IV.

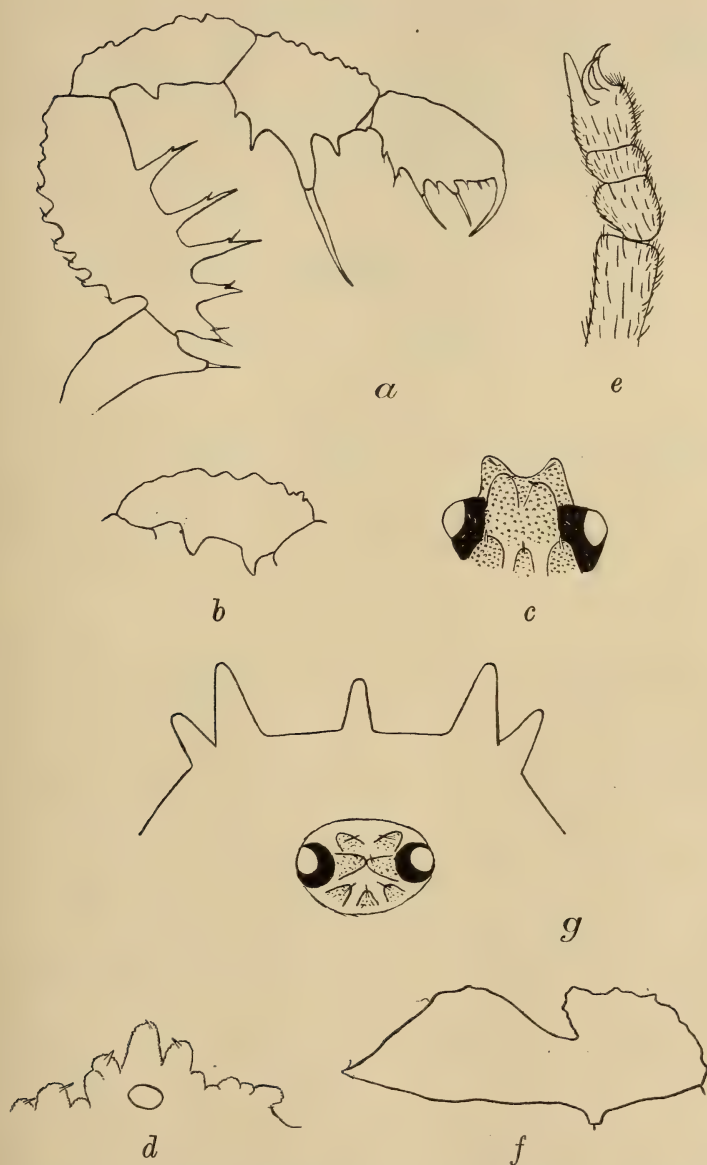


FIG. 5.—*Namutonia scabra*. a, palp from outer side; b, patella of pedipalp from inner side; c, ocular tubercle from above; d, from side; e, tarsus IV; f, chelicera, segment I; g, anterior margin of carapace from above.

Measurements.—Length of body 3–3.5 mm.

Types, 6 specimens (sex ?) from Okorosave, Kaokoveld, South-West Africa.

Other specimens: Grootfontein, Damaraland, South West Africa (1); Namutoni, Damaraland, South West Africa, (1); Kunene River, Ovamboland, South West Africa (3).

I have been unable to distinguish sexual characters in these specimens.

SUBFAM. **Assamiinae** Roewer.

1923. Roewer, Die Weberknechte der Erde, p. 236.

Two genera in South Africa.

Key to genera.

1. Tarsus I consisting of 4 segments, tarsus II of 5 segments

Polycoryphus, p. 365.

- Tarsus I consisting of 5 segments, tarsus II of 10 segments

Cryptopygoplus, p. 360.

Gen. **CRYPTOPYGOPLUS** n. gen.

Most resembling the genus *Wintonia* from Australia, see Roewer's key to the genera of *Assamiinae* (*loc. cit.*, p. 236). Tarsus I with 5, II with 10 segments, the terminal section of the latter consisting of 3 segments; ocular tubercle transversely oval, convex but not prominent, unarmed but with about 25 granules scattered irregularly over it; no median tooth on the anterior border of carapace but the area between the ocular tubercle and the anterior margin of the carapace convexly rounded; granulation of body consisting of stout, sometimes club-shaped granules, themselves finely granular and tipped with a seta; areas of fused portion of carapace, four in number, clearly defined by transverse grooves, bearing definite but rather irregular transverse rows of granules; granules on fused portion of carapace not so markedly different in size as in the case of *Wintonia* (fig. 271, p. 247, *loc. cit.*); stigmatae not visible; femur of pedipalp with a ventral row of teeth which are shorter or hardly longer than the diameter of the femur seen from the side; legs long and slender, unarmed but finely granular; coxa IV anteriorly near its base without an enlarged spine; claws of tarsi III and IV simple; tarsal segments I, 5; II, 9–11; III, 6; IV, 7.

Three species in South Africa.

Key to species.

1. Anterior surface of segment II of chelicera with a stout tooth near its distal apex (fig. 8, b) *rhodesianus*, p. 363.
Anterior surface of segment II of chelicera without a tooth near its distal apex 2.
2. Free tergites with more than 1 complete transverse row of granules, femur of pedipalp with 1 stout triangular tooth at its distal inner apex (fig. 6, b)
africanus, p. 361.
Free tergites with only 1 complete transverse row of granules, these larger than those of the other segments, femur of pedipalp with 2 spine-like teeth at its distal inner apex (fig. 7, c) *damaranus*, p. 362.

Cryptopygoplus africanus n. sp.

(Text-fig. 6, a-e.)

Colour yellowish-brown, fused portion of carapace blackish; anterior border of carapace without a median tooth in front of ocular



FIG. 6.—*Cryptopygoplus africanus*. a, ocular tubercle from side; b, femur of palp from inner side; c, apex of femur from below; d, tibia and tarsus of palp; e, chelicera.

tubercle; ocular tubercle as in fig. 6, a, seen from the side, broader than long, distinctly demarcated from the rest of the carapace, covered with about 25 small round granules; some granules behind and at the sides of the ocular tubercle; area containing the ocular tubercle separated from the remainder of the fused area by a procurved groove, the first area bordered posteriorly by a recurved groove, the second one by a straight groove, the last two by slightly procurved grooves; the 4 areas with fairly close and regularly set granules about 3 rows

deep, the granules of the middle row the largest; dorsal scute bordered at the sides and posteriorly by a coarsely granular strip separated from the areas by a distinct groove which is without granulation; free tergites bordered anteriorly by 2 rows of granules in I and II, by 3 rows in III; sternites weakly granular in anterior $\frac{2}{5}$, fine matt in posterior $\frac{3}{5}$; coxae inferiorly irregularly granular, coxa IV below with a row of 4 club-shaped granules along its posterior margin almost meeting at an angle a row of 5 similar granules at the side of the stigma-bearing sternite, a patch of blackish granules along its anterior side above.

Pedipalp.—Trochanter with 1 large and 1 small tooth below, femur as in fig. 6, *b*, seen from the inner side, with a row of 11 teeth below and a large tooth apically on the inner side; patella with 2 long teeth ventrally on the inner side, 1 on the outer side; tibia and tarsus as in fig. 6, *d*, showing outer row of teeth, inner row of both segments consisting of 3 small teeth alternating with 2 large long ones as in tarsus of *C. damaranus* (fig. 7, *b*).

Chelicera.—Segment I dorsally with the distal raised surface covered with rounded granules (fig. 6, *e*), 1 or 2 of those on the outer side distally, enlarged, ventral surface granular; segment II shiny, anterior surface with a patch of small tooth-like granules basally on the outer and inner sides; tarsal segments I, 5; II, 9–11; III, 6; IV, 7.

Measurements.—Total length of body 4.9 mm.

Types and genotypes, 2 specimens (males?) from Inhambane, Portuguese East Africa

Cryptopygoplus damaranus n. sp.

(Text-fig. 7, *a-e*.)

Colour yellow, fused portion of carapace slightly infuscated, tarsi almost white; this species differs from the preceding one chiefly in the granulation of the fused portion of the carapace; the granulation of the body is less dense, those in the neighbourhood of the ocular tubercle are larger, the 4 areas of the fused portion of carapace are not so distinctly divided; areas III and IV are provided with a row of enlarged granules and some other smaller ones not arranged in regular transverse rows; the free tergites and posterior border of fused portion of carapace without several rows of smaller round granules but bordered posteriorly by a single transverse row of enlarged conical granules; lateral margin of fused portion of carapace

bordered by a strip of weak granules very much smaller than those in the middle of the carapace; sternites matt with a single distinct anterior row of small round granules.

Pedipalp as in figs. 7, *a*, *b*; femur seen from the inner side with 9 ventral teeth a little longer than the diameter of the femur; on the inner side at apex 2 teeth with their inner axes almost at right angles to the axes of the ventral teeth (fig. 7, *c*), seen from below; patella, tibia, and tarsus seen from below with the teeth on the outer side of these segments as in fig. 7, *b*, the teeth on the inner side not drawn; patella on inner side with 2 teeth (fig. 7, *d*), tibia and tarsus both with teeth

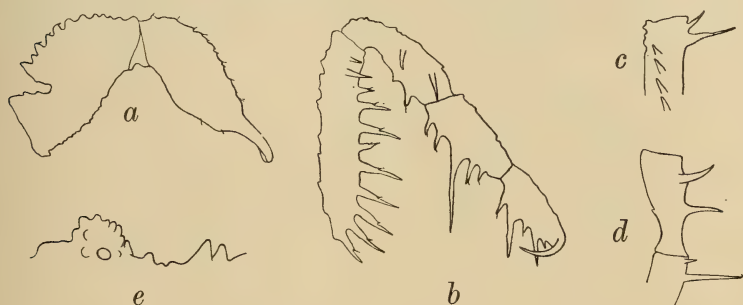


FIG. 7.—*Cryptopygoplus damaranus*. *a*, chelicera; *b*, palp from inner side; *c*, femur of palp from below; *d*, patella of palp from above; *e*, ocular tubercle.

on inner side similar to those on the outer side of tarsus, viz. 3 small ones alternating with 2 large long ones.

Chelicera as in fig. 7, *a*, segment I with the dorsal surface of raised distal portion covered with granules, at the sides matt, a few granules below; segment II shiny with a few granules basally on its inner surface. Legs unarmed; tarsal segments I, 5; II, 10; III, 6; IV, 7.

Measurements.—Total length 3.6 mm.

Types, 3 specimens (males?) from Kaoko Otavi, Kaokoveld, South West Africa. Other specimens: 2 from Okorosave, Kaokoveld; 1 from Tsumeb, Damaraland, South West Africa.

Cryptopygoplus rhodesianus n. sp.

(Text-fig. 8, *a*-*b*.)

Colour yellowish-brown, some of the granules round the ocular tubercle infuscated black; granules behind and at the sides of the ocular tubercle fairly large, tipped with setae which are directed forwards and medially; areas I-IV and free tergites with 2 rows of

granules the posterior row enlarged, the posterior row of the free tergites consisting of larger granules than those of the posterior rows of areas I-IV; sternites shagreened with a row of small granules nearer to their posterior than to their anterior border; coxae irregularly granular, coxa IV at its posterior distal border with a row of 4 enlarged club-shaped granules which is opposed to a similar row at the side of the stigma-bearing sternite.

Pedipalps.—Trochanter with 1 large, 1 small tooth below, 1 small tooth above; femur with a row of 9-11 teeth below, 2 inner apical teeth, one long and spine-like, the other close to it, much smaller; patella with 2 long spines on inner, 1 shorter one on outer side; tibia with teeth arranged proximo-distally as follows: outer side—



FIG. 8.—*Cryptopygoplus rhodesianus*. *a*, chelicera; *b*, apex of anterior surface of segment II.

3 short, 1 long, 1 short; inner side—1 short, 1 long, 2 short, 1 long, 1 short; tarsus similarly on both sides with 2 short, 1 long, 2 short, 1 long, 1 short.

Chelicerae.—Segment I as in other species, segment II shiny, with some spine-like teeth basally on the inner side; near distal apex on the inner side there is a stout pear-shaped tooth on the anterior surface just above the insertion of the immovable finger of the claw (figs. 8, *a*, *b*); this tooth is quite absent in the other species.

Tarsal segments I, 5; II, 8; III, 6; IV, 7.

Measurements.—Total length 3.2-3.6 mm.

Types, 4 specimens from Umtali, Rhodesia (3 males, 1 female?). The chelicerae of the specimens I take to be ♂♂ are in this genus larger than those of the ♀♀. In one of the smaller specimens of *C. rhodesianus*, which is presumably a ♀, the II leg is much longer in proportion to the remaining legs than in the ♂♂. There is no large tooth on the chelicerae.

Gen. POLYCORYPHUS Loman.

1902. Loman, Zool. Jahrb. Syst., xvi, pp. 188, 195.

1923. Roewer, Die Weberknechte der Erde, p. 274, fig. 290.

Ocular tubercle in middle of carapace, coarsely and irregularly tuberculate; upper frontal margin of carapace in front of ocular tubercle with 1 median conical tooth; dorsal scute a little constricted opposite the III coxa, broadening again posteriorly; area I without a median longitudinal groove; all areas and free tergites with very coarse tubercles and with a median pair of tubercles a little more prominent than the rest; operculum anale with one median spine; stigmatae hidden under the teeth filling up the cleft between coxa IV and the stigma-bearing sternite; coxa IV laterally at its base without 1 large tooth; segment I of chelicera distinctly swollen at its dorso-distal extremity; femur of pedipalp with 1 spine medially at its apex, inferiorly with a row of ventral teeth which are shorter than its diameter; legs stout, femora of III and IV with sigmoid curvature; terminal section of tarsus II with 2 joints; tarsal segments I, 4; II, 5; III, 5; IV, 5.

One species in South Africa.

Polycoryphus asper Loman.

(Text-fig. 9.)

1902. Loman, Zool. Jahrb. Syst., xvi, p. 195, Taf. 9, fig. 14.

1923. Roewer, Die Weberknechte der Erde, p. 274, fig. 290.

Colour.—Body and appendages reddish yellow, a dorsal median band and legs I-IV reticulate with black.

Ocular tubercle and anterior margin of carapace as in fig. 9; carapace, dorsal scute, and I-III free tergites coarsely and irregularly tuberculate; areas I-V and I-III free tergites with a slightly more prominent median pair of tubercles in addition, these directed posteriorly; operculum anale with 1 median spine; all free sternites coarsely granular; surfaces of coxae I-IV and latero-dorsal surface of coxa IV coarsely granular; dorso-distal swelling of I segment of chelicera and all segments of pedipalp dorsally with coarse granulation; legs unarmed except trochanters I-IV posteriorly, which are armed with 2-3 teeth; tarsal segments I, 4; II, 5; III, 5; IV, 5.

Length of body 4.5, pedipalps 2.5; legs I-IV, 7 : 10 : 8 : 12 mm.



FIG. 9.—*Polycoryphus asper* Loman. Ocular tubercle.

Type, 1 ♀ from Port Elizabeth; Roewer records 1 ♀ and 1 juvenile from Cape Town. This species is not present in the Museum's collection, and though the Cape Peninsula has been more thoroughly searched for Opiliones than any other part of South Africa this form has as yet not been discovered by local collectors.

FAM. **TRIAENONYCHIDAE** Sorensen.

For a summary of the family characters see :

1923. Die Weberknechte der Erde, C. Fr. Roewer, p. 585.

This family contains the very great majority of South African Laniatores and these are grouped in 2 subfamilies, the *Adaeinae* and *Trioenonychinae*; a third subfamily, the *Trioenobuninae*, is confined to Australia.

Key to subfamilies.

- | | | | | |
|---|---|---|---|----------------------------------|
| 1. Shape of sternum as in fig. 16, <i>b</i> | . | . | . | <i>Trioenonychinae</i> , p. 366. |
| Shape of sternum as in fig. 43 | . | . | . | <i>Adaeinae</i> , p. 424. |

SUBFAM. **Trioenonychinae** Pocock

1902. Pocock, Ann Mag. Nat. Hist., ser. 7, x, p. 512.

1923. Roewer, Die Weberknechte der Erde, p. 586.

Pocock separated the 2 South African subfamilies *Trioenonychinae* and *Adaeinae* on the basis of two characters, viz. the shape of the sternum, and the stigmata which were exposed in the *Trioenonychinae* and hidden in the *Adaeinae*; the first-named character is the only one which holds good for differentiating the two groups; it is quite constant and in itself is enough to distinguish a *Trioenonychid* from an *Adaeinid*; the stigma may be exposed in genera occurring in other parts of the world, but as far as the 13 South African genera are concerned the exceptions are more numerous than the rule, the stigmata being exposed in only 2 of them—*Austronuncia* and *Speleomontia*; as a rule there are large conical granules forming a bridge over the gap between coxa IV and the stigma-bearing sternite, the stigma-bearing sternite being often reduced and partly hidden beneath the bridging granules. The *Trioenonychinae* are in general distinctly smaller in body size than the *Adaeinae* and include all the smallest members of the family; the body length varies between 2 and 4.5 mm., that of the *Adaeinae* between 4.5 and 7.6 mm., *Micradæum* excepted. In many

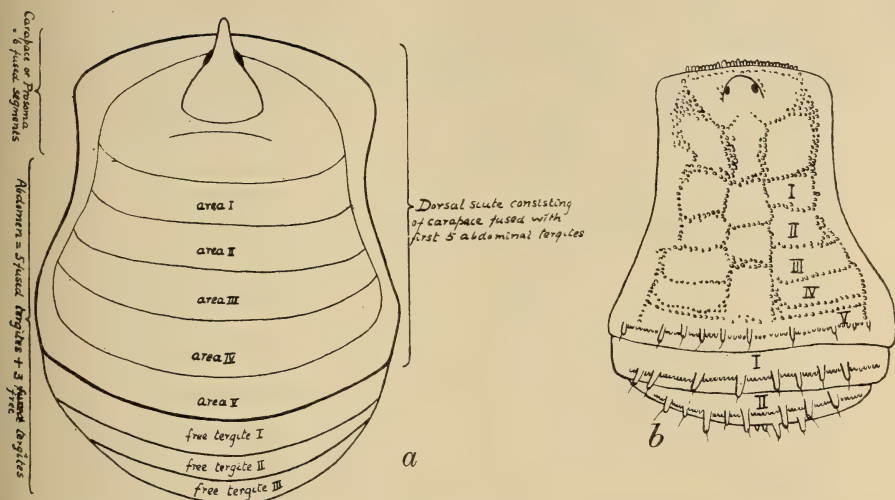


FIG. 10.—Dorsal segmentation of Triaenonychidae. *a*, *Rostromontia* (Triaenonychinae); *b*, *Cryptadaeum* (Adaeinae).

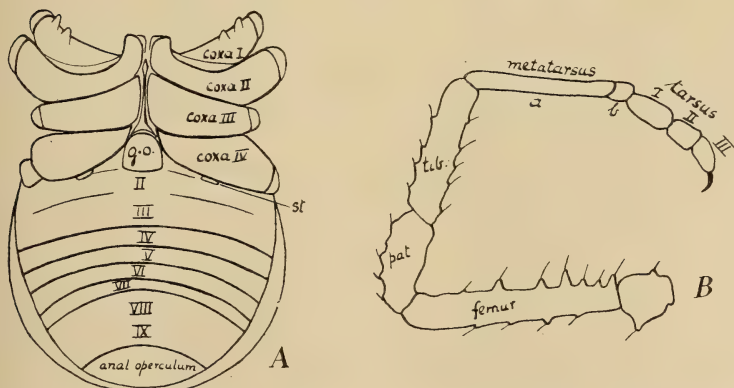


FIG. 11.—*A*, ventral surface of Triaenonychidae, *Rostromontia*; II-IX sternites, II-III fused, forming stigma-bearing sternite, IV-IX free sternites; *g.o.*, genital operculum; *st.*, stigmata (hypothetical, actually hidden under coxa IV). *B*, leg I of *Rostromontia*, metatarsus divided into: *a*, astragalus; *b*, calcaneus; I-III, tarsal segments.

of the genera the first coxa is provided at its anterior distal margin with 2 large and prominent conical tubercles which may be bifid or simple; with this character is associated a strip of fine bead-like granulation on the ventral surface of the femur of the pedipalp which extends its whole length in the middle and is flanked on its outer side by a row of enlarged teeth, the basal one of which is sometimes bifid and enlarged; on the inner side of the median strip is a row of much smaller teeth or granules which are sometimes reduced and almost obsolete; these characters do not occur in 5 genera—*Mensamontia*, *Austronuncia*, *Graemontia*, *Acumontia*, and *Speleomontia*; here instead of 2 conical tubercles the anterior margin of coxa I is provided with a row of 4–6 much slenderer conical or papilliform teeth tipped with setae, these being not essentially different in form from those found on the ventral surface of the pedipalp and the femur of leg I; in these genera there is no strip of fine bead-like granulation in the middle of the ventral surface of the pedipalp femur and the spines on all the segments of the pedipalp are much longer and are tipped with long stout setae. In all genera except *Roeweria* and *Speleomontia* the lateral prongs of the claws of tarsi III and IV are subsidiary in size and length to the main median prong; in the above-mentioned genera the reverse is the case. In all genera except 3 the calcaneus of metatarsi I and II is much shorter than the astragalus; in *Cryptobunus* and *Biacumontia* the calcaneus is longer than or only a little shorter than the astragalus; in *Austromontia* it is shorter than the astragalus but not so short as in other genera. In about half the genera the dorsal scute is fused into one piece without transverse grooves dividing it into areas.

The sexes are best distinguished by the size and spination of the pedipalps; in the males these are much larger and stouter than in the females; the outer teeth on the ventral surface of the femur, when these are present, are larger in the males, but those on the ventral surface of tibia and tarsus are on the contrary larger in the females; these teeth in the females are more prominent than in the males, tipped with setae and with other stout setae between them; the teeth on these segments in the males are irregular and granuliform; in some genera (*Rostromontia*, *Ceratontia*) the spine or process of the ocular tubercle is longer in the male than in the female; the femur of the first leg if armed inferiorly is armed in both sexes. On page 424 is a table of characters of South African genera of *Triaenonychinae*.

Thirteen genera occur in South Africa.

Key to genera.

1. Inferior surface of pedipalp femur with a strip of fine granulation in the middle (fig. 23, e), flanked on the outer side with a row of stout triangular teeth, remaining segments of pedipalp armed with smaller teeth; coxa I below with 2 tubercles along its anterior margin, the distal one usually bifid (fig. 23, c) 2.
 Inferior surface of pedipalp femur without a strip of fine granulation in the middle, all segments of pedipalp with numerous equal-sized long conical spines tipped with long and powerful setae (fig. 37, e), coxa I below with 4-5 or more spines along its anterior margin similar to though smaller than those of the pedipalp (fig. 37, f) 9.
2. Tarsus I with 2 segments 3.
 Tarsus I with 3 segments 4.
3. Tarsus II with 3 segments, calcaneus of metatarsus I much shorter than astragalus *Ceratomontia*, p. 370.
 Tarsus II with 4 segments, calcaneus of metatarsus I at least $\frac{1}{2}$ the length of astragalus *Biaccumontia*, p. 403.
4. Tarsus II with 3 segments *Monomontia*, p. 416.
 Tarsus II with more than 3 segments 5.
5. Tarsus II with 4 segments *Austromontia*, p. 398.
 Tarsus II with more than 4 segments 6.
6. Tarsus II with 8-9 segments, median prong of claws of tarsi III and IV weaker than the lateral claws *Roeweria*, p. 384.
 Tarsus II with 5 segments, median prong of claws of tarsi III and IV stronger than the lateral claws 7.
7. Calcaneus of metatarsi I and II longer than astragalus (fig. 28, f) *Cryptobunus*, p. 396.
 Calcaneus of metatarsi I and II much shorter than astragalus (fig. 25, b) 8.
8. Dorsal scute not divided into areas by transverse grooves, anterior margin of carapace with a row of round club-shaped granules (fig. 23, a) *Amatola*, p. 386.
 Dorsal scute divided into areas by transverse grooves (fig. 24, a), anterior margin of carapace without a row of round club-shaped granules *Rostromontia*, p. 388.
9. Tarsus I with 3 segments 10.
 Tarsus I with more than 3 segments 11.
10. Granules behind and at the sides of the ocular tubercle arranged in rows forming a symmetrical pattern (fig. 37, c) *Graemontia*, p. 413.
 Granules behind and at the sides of the ocular tubercle irregularly disposed (fig. 20, a) *Mensamontia*, p. 381.
11. Tarsus I with 4 segments *Austronuncia*, p. 411.
 Tarsus I with 5 segments 12.
12. Dorsal scute armed (fig. 41, a), ocular tubercle with a single terminal spine *Acumontia*, p. 420.
 Dorsal scute unarmed (fig. 42, a), ocular tubercle rounded and low *Speleomontia*, p. 422.

Gen. CERATOMONTIA Roewer.

1923. Roewer, Die Weberknechte der Erde, p. 619, fig. 778, a-g.

Carapace narrower than dorsal scute; ocular tubercle situated in anterior third of carapace, with or without a median spine; areas I-V, free tergites I-III, and operculum anale unarmed but with 1 or 2 transverse rows of granules; coxa I below with 2 large tubercles along its anterior margin; stigmatae hidden. Pedipalp: femur below, often with a large bifid tooth on the outer side near its base, a longitudinal strip of fine granulation in the middle; inferior surface of femur of leg I armed with conical granules in both sexes; calcaneus of all legs much shorter than the astragalus; terminal section of leg I with 1, II with 2 segments; tarsal segments 2:3:3:3; median prong of claws of tarsi III and IV much stronger than the lateral prongs.

Ten species, Cape Province.

Key to species.

1. Femur of palp with a longitudinal row of 10-11 teeth above (fig. 89)
werneri, p. 505.
 Femur of palp with a longitudinal row of at most 5 teeth above (fig. 17, d) 2.
2. Areas of dorsal scute with 1 row of granules *tabulae*, p. 371.
 Areas of dorsal scute with 2 rows of granules 3.
3. Chelicerae without large teeth on dorsal surface of segment I (fig. 18, g) 4.
 Chelicerae with large teeth on dorsal surface of segment I 5.
4. Anterior margin of carapace with 4 granules on each side of ocular tubercle (fig. 18, f), granules on areas I-III of dorsal scute irregularly disposed
irregularis, p. 378.
 Anterior margin of carapace with 2 granules on each side of ocular tubercle, granules on areas of dorsal scute in 2 regular rows *capensis*, p. 375.
5. Ocular tubercle drawn out into a pointed spine 5-6 times as long as diameter of eye (fig. 13, a) 6.
 Ocular tubercle not drawn out into a spine, terminal process short or absent 7.
6. Segment II of chelicerae with a thickened tubercle above the immovable claw (fig. 88) *cheliplus*, p. 504.
 Segment II of chelicerae without a thickened tubercle above the immovable claw *fluvialis*, p. 372.
7. Largest tooth on dorsal surface of pedipalp trochanter greatly exceeding the largest tooth on dorsum of femur (fig. 15, e), dorsal surface of segment I of chelicerae with 2 large teeth in the middle (fig. 15, a) *minor*, p. 374.
 Largest tooth on dorsal surface of pedipalp trochanter hardly exceeding or smaller than the largest tooth on dorsum of femur (fig. 14, a), dorsal surface of segment I of chelicerae with 1 or 0 large teeth in the middle (fig. 14, d) 8.
8. Anterior margin of carapace with 3 granules on each side of ocular tubercle, free tergite I with a transverse row of about 8 indistinct granules not reaching the sides of the segment *hewitti*, p. 376.

- Anterior margin of carapace with 2 granules on each side of the ocular tubercle, free tergite 1 with a transverse row of about 20 large distinct granules reaching the sides of the segment 9.
9. Dorsal surface of segment I of chelicerae with an upright tooth in the middle (fig. 14, *d*) *karrooensis*, p. 373.
- Dorsal surface of segment 1 of chelicerae with a hooked process near distal apex (fig. 19, *g*) *setosa*, p. 379.

Ceratomontia tabulae n. sp.

(Text-fig. 12, *a-e*.)

Colour.—Carapace and ocular tubercle yellow with black reticulate markings, dorsal scute behind carapace with a median black stripe, posterior border of dorsal scute and free tergites with a transverse black band; appendages yellow with fine black reticulate markings. Anterior upper margin of carapace with 4 granules (2 on each side); ocular tubercle (fig. 12, *a*), seen from the side, with a few scattered granules; all areas of dorsal scute with only 1 transverse row of granules on a matt background composed of minute granules; all free

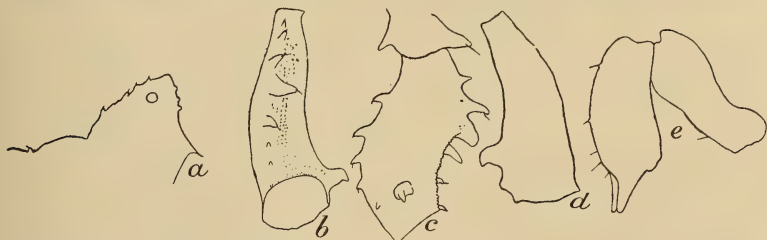


FIG. 12.—*Ceratomontia tabulae*. *a*, ocular tubercle; *b*, femur of palp below; *c*, from inner side; *d*, from above; *e*, chelicera.

tergites with similar rows of granules; sternites matt with 1 or 2 rows of small granules; coxae smooth, coxa I distally on anterior border with 2 conical teeth, the more distal one compound, behind these a row of 4–5 small shiny granules; coxa II with 4 granules along its posterior distal margin. Pedipalp: femur seen from above (fig. 12, *d*), with a large hooked tooth at its inner apex, 4 teeth above (fig. 12, *c*), below with a row of 5 large teeth on the outer side, a strip of bead-like granules mesially to this row (fig. 12, *b*); chelicera unarmed (fig. 12, *e*). Femur of leg I with 4 seta-tipped conical granules inferiorly; tarsal segments I, 2; II, 3; III, 3; IV, 3.

Measurements.—Total length 2.2 mm.

Types, 4 specimens from St James, Cape Peninsula. Other specimens from Newlands, Hout Bay, Simonstown, Platteklip Ravine, Kalk Bay, all Cape Peninsula.

Ceratomontia fluvialis n. sp.

(Text-fig. 13, a-f.)

Colour light yellowish brown, some blackish markings behind ocular tubercle, a median blackish stripe down tergites; anterior margin of carapace with 3 enlarged granules on each side, region behind ocular tubercle with some irregular granules arranged in 2



FIG. 13.—*Ceratomontia fluvialis*. a, ocular tubercle; b, femur of palp from outer side; c, tibia and tarsus of palp from below; d, femur of palp from below; e, chelicera; f, femur of leg I.

short strips; ocular tubercle seen from the side (fig. 13, a), with a single drawn out upwards and forwardly projecting process; free segments not easily distinguished from fused area; dorsal scute behind carapace divided into 4 areas by transverse grooves, each area with an anterior or middle row of large granules and a posterior row of small granules; posterior margin of dorsal scute and free tergites each with 1 row of larger tubercles which may be doubled at the sides; sternites with 0 or 1 row of small granules. Pedipalp seen from the outer side (fig. 13, b), trochanter with 0 teeth below, 1 large tooth above, femur with 5 spines above; seen from below as in fig. 13, d; outer side below

flanked by a fairly close-set row of teeth including 1 bifid basal tooth, a well-defined strip of fine granulation mesially to this outer row of teeth; patella unarmed, tibia and tarsus seen from below and a little from the outside as in fig. 13, *c*; chelicera as in fig. 13, *e*, the I segment long, reaching to further than half the length of femur of pedipalp. Legs: coxa I with 2 sharp tubercles along its anterior margin, II with a double row of granules at its distal posterior apex, III with 1 or 2 granules at anterior distal apex, IV with a double row of granules at anterior distal apex; femur of leg I as in fig. 13, *f*; tarsal segments of I slender, of II much longer than broad; tarsal segments I, 2; II-IV, 3.

Measurements.—Pedipalps 6.5; length of body 4.5, breadth 3 mm.

Type, 1 specimen (♂ ?) from Riversdale Mountains, Cape Province.

Ceratomontia karrooensis n. sp.

(Text-fig. 14, *a-e*.)

Colour yellow. Dorsal scute with rows of granules crowned with setae in the middle of each area smaller than the similar granules of the free tergites; in addition, areas of dorsal scute bordered posteriorly with shiny bead-like granules; upper anterior margin of carapace with 2 seta-tipped granules on each side of the ocular tubercle; ocular tubercle seen from the side as in fig. 14, *e*, its posterior surface with some shiny round granules, the region just posterior to the ocular tubercle with a double longitudinal row of round shiny granules on each side; sternites finely granular, each with 2 transverse rows of small seta-tipped granules, their posterior edges not bordered by granules. Pedipalp as in fig. 14, *a*, seen from inner side; trochanter with 2 superior teeth, 1 moderate and 1 small, 1 inferior tooth; femur above with 5 teeth, below with about 6 teeth on outer side, the large basal one bifid, a row of 6 denticles on the inner side, between these rows a row of bead-like granules which is doubled in its distal half; patella, tibia, and tarsus seen from below as in fig. 14, *c*, the ventral surface of tibia between the outer and inner teeth slightly concave and filled with smooth low granules which tend to form indistinct transverse rows. (Chelicera as in fig. 14, *d*.) Legs: coxae below smooth, I with 2 small tubercles anteriorly at its distal apex, posterior distal apex of II with 3-4, anterior distal apex of IV with 3 granules; tarsal segments I, 2; II-IV, 3.

Measurements.—Total length 2.8 mm.

Type, 1 specimen from Montagu, Cape Province.

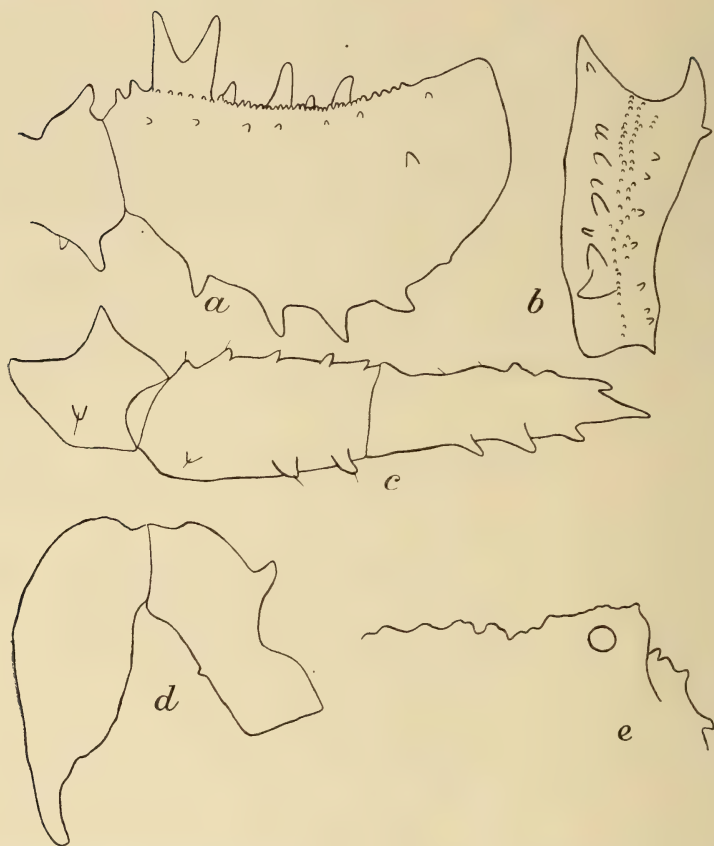


FIG. 14.—*Ceratomontia karrooensis*. *a*, femur of palp from inner side; *b*, from below; *c*, patella—tarsus of palp from below; *d*, chelicera; *e*, ocular tubercle.

Ceratomontia minor n. sp.

(Text-fig. 15, *a-e*.)

Colour light greenish yellow, carapace infuscated blackish at the sides and behind the ocular tubercle, dorsal scute infuscated in the middle and at the sides, free tergites transversely infuscated. Dorsum finely granular, the areas of dorsal scute with a transverse row of seta-tipped granules in the middle and a posterior border of round shiny bead-like granules; ocular tubercle seen from the side as in fig. 15, *c*, a few shiny granules on its posterior side; upper anterior margin of carapace with 2 seta-tipped granules on each side; free tergites

with a row of granules in the middle as in the areas of the dorsal scute but without a row of bead-like granules posteriorly; sternites finely granular but not bordered posteriorly. Pedipalp: femur and trochanter seen from the side armed as in fig. 15, *e*; seen from below femur armed along its outer edge with 1 large bifid tooth basally and 5 other much smaller teeth; inner side with 4 small rounded teeth; between these rows a double row of small bead-like granules with some other similar granules scattered near them (fig. 15, *d*); tibia seen from below as in fig. 15, *b*, consisting of a concave surface filled with small



FIG. 15.—*Ceratomontia minor*. *a*, chelicera; *b*, tibia and tarsus of palp from below; *c*, ocular tubercle; *d*, femur of palp below; *e*, femur of palp from side.

indistinct granules and flanked on each side by a row of moderate-sized teeth. Chelicera as in fig. 15, *a*; segment I with 2 large subequal teeth above. Legs: surfaces of coxae below smooth, coxa I with a few granules and a pair of conical tubercles anteriorly at its distal apex; tarsal segments I, 2; II–IV, 3.

Measurements.—Total length 2.3 mm.

Type, 1 specimen from East London.

Ceratomontia capensis Roewer

(Text-fig. 16, *a–g*.)

1923. Roewer, Die Weberknechte der Erde, p. 619, fig. 778, *a–g*.

The following is Roewer's description of the types:—

Colour.—Body and all appendages rusty yellow. Body and ocular tubercle armed as in fig. 16, *a*; areas of dorsal scute with 2 transverse rows of granules; all free sternites with traces of a row of granules at

the sides ; genital operculum smooth ; surfaces of coxae I-IV smooth ; coxa I with an anterior row of 4 tubercles, III with 1 posterior and 1 anterior row, IV with 1 posterior row of tubercles ; chelicera unarmed and smooth as in fig. 16, *e* ; pedipalp seen from inner and outer sides as in figs. 16, *g*, *f* ; legs powerful, trochanters I-IV coarsely granular ; femora I-IV with rows of granules ; tarsal segments I, 2 ; II, 3 ; III, 3 ; IV, 3 ; secondary sexual characters of ♂ present in I leg in

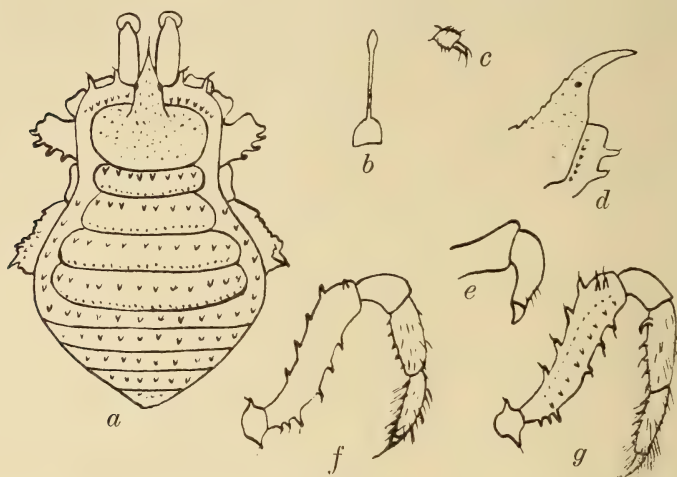


FIG. 16.—*Ceratomontia capensis*, Roewer. *a*, dorsal surface of body ; *b*, sternum ; *c*, claw of tarsus IV ; *d*, ocular tubercle ; *e*, chelicera ; *f*, palp from outer ; *g*, from inner side. (Copied from Roewer.)

which the femur is provided ventrally near its base with 3 blunt tubercles ; calcaneus normal in the ♂.

Measurements.—Length of body 3, pedipalps 4 ; legs I-IV, 5 : 8 : 6 : 9 mm.

Types, 2 (♂♀), 2 pull. Port Elizabeth. Collected Roewer.

Ceratomontia hewitti n. sp.

(Text-fig. 17, *a-f*.)

♂. *Colour*.—Yellow brown speckled with black.

Dorsum with a background of small fine granules ; anterior margin of carapace with 3 stout conical seta-tipped granules on each side of the ocular tubercle (fig. 17, *c*), a similar granule at the antero-lateral angles of carapace ; ocular tubercle as in fig. 17, *c*, the terminal process

fairly short and blunt, 1-2 large conical granules laterally at the base of the ocular tubercle; area posterior to ocular tubercle with about 6 round granules not arranged in 2 longitudinal rows; areas with 2 rows of granules, a middle one consisting of enlarged seta-tipped granules and a posterior one consisting of minute round granules; area V and free tergites with only 1 row of enlarged seta-tipped granules; sternites with 2 indistinct rows of small granules; coxae below smooth and shiny.

Pedipalp: femur above with 5 strong more or less equal-sized teeth, these smaller than the larger of the 2 teeth on the dorsal surface of

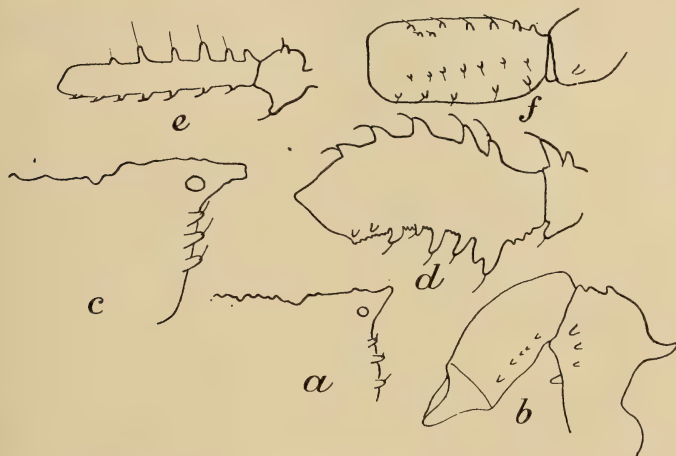


FIG. 17.—*Ceratomontia hewitti*. a, ocular tubercle of ♀; b, chelicera; c, ocular tubercle; d, femur of palp from outer side; e, femur of leg I; f, tibia of palp from below, all of ♂.

trochanter (fig. 17, d); below on outer side with a bifid basal tooth and 4 other smaller teeth; outer surface of femur smooth, inner surface matt granular with a stout triangular tooth near upper apex; patella with a small tooth on inner side near apex, tibia as in fig. 17, f, seen from below, a row of about 9 stout seta-tipped granules on outer side, inner side with 2 rows; tarsus with a large triangular semi-divided tooth basally on the outer side followed by 4 much smaller teeth, inner side with 3 teeth; chelicera as in fig. 17, b, femur of leg I as in fig. 17, e, femora of remaining legs unarmed; tarsal segments 2:3:3:3.

Measurements.—Total length 2.2, pedipalps 3 mm.

♀. As in ♂ with the following differences: ocular tubercle shorter,

the 3 granules along the anterior margin of carapace smaller (fig. 17, *a*); the genital operculum proportionately wider than in ♂, the pedipalps considerably shorter in proportion to the body. Femur of leg I armed as in ♂.

Measurements.—Total length 2, pedipalps 2.1 mm.

Types, 9 ♂♂, 5 ♀♀, Alicedale, Eastern Cape Province. Types in Albany Museum, Grahamstown.

Ceratomontia irregularis n. sp.

(Text-fig. 18, *a-g*.)

Colour.—Body and legs dark, almost black, pedipalps brown, sternites with a lighter median longitudinal stripe.

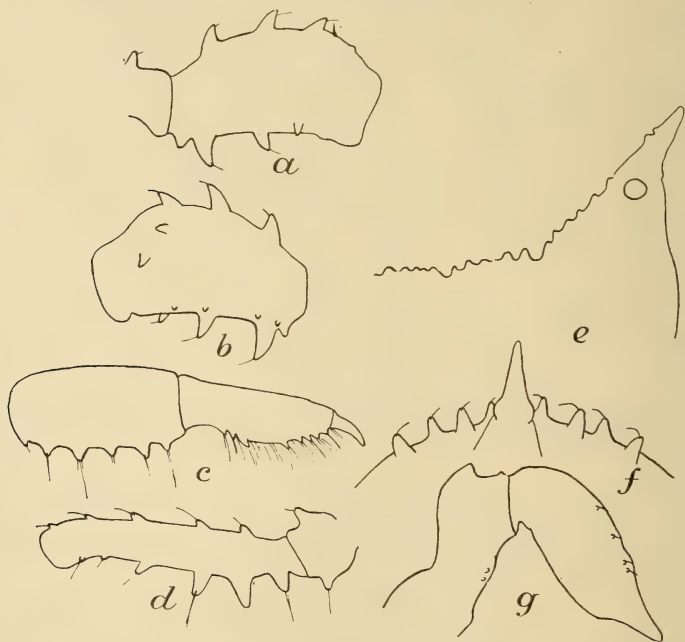


FIG. 18.—*Ceratomontia irregularis*. *a*, femur of palp from outer; *b*, from inner side; *c*, tibia and tarsus of palp; *d*, femur of leg I; *e*, ocular tubercle; *f*, anterior margin of carapace from above; *g*, chelicera.

Grooves defining the areas deep and very distinct, passing right across the dorsal scute to meet the lateral grooves; anterior margin of carapace with 4 large conical seta-tipped granules on each side of the ocular tubercle (fig. 18, *f*, seen from above); ocular tubercle seen

from the side as in fig. 18, *e*, the sides thickly granular, its posterior surface fairly smooth in the middle; area posterior to ocular tubercle with scattered round granules, a strip in the middle smooth; areas of dorsal scute with coarser granules than in other species, those of areas I-III irregularly disposed, more than 2 deep, not forming 2 distinct rows but the larger and smaller granules intermixed; area IV with an anterior row of larger conical granules, a posterior row of small round granules; area V with a single row of larger granules, free tergites I-II with 1 row, III with 2 rows of larger seta-tipped granules; sternites with 2 rows of small round granules, those of the anterior row larger, some of them tipped with short white setae; inferior surfaces of coxae smooth and shiny with a few scattered white setae, coxa I with 2 small granuliform tubercles on its anterior margin, the distal one bifid.

Pedipalp: femur below on outer side with 3 teeth, the 2 basal ones large, the third small (fig. 18, *a*), inner side below as in fig. 18, *b*, with 4 small round granules, inferior surface of femur between these rows without the usual median strip of minute granules, at most rugose; patella unarmed except for a small granule on inner side below, tibia below with an outer row of 5 distinct granules (fig. 18, *c*), an inner row of 3, tarsus on outer side as in fig. 18, *c*, inner side with 3 large teeth alternating with 3 smaller teeth; chelicera as in fig. 18, *g*, segment I without a dorsal tooth; femur of leg I armed as in fig. 18, *d*, remaining femora unarmed; tarsal segments 2 : 3 : 3 : 3.

Measurements.—Total length 3, breadth 2·7, pedipalps 3·2 mm.

Type, 1 (♀ ?), Stones Hill, Grahamstown. Type in Albany Museum, Grahamstown.

Another specimen from Grahamstown has a median pair of granules in each area of dorsal scute slightly enlarged.

Ceratontia setosa n. sp.

(Text.-fig. 19, *a-h*.)

♂. *Colour* light brown with ramifying black streaks, a vertebral blackish stripe on dorsal scute tapering posteriorly, free tergites blackish in anterior half.

Anterior margin of carapace with 2 large conical seta-tipped granules on each side of the ocular tubercle; ocular tubercle above with coarse round granules seen from the side as in fig. 19, *b*; area posterior to the ocular tubercle with 4 enlarged conical granules in the middle forming a square; areas with 2 regular rows of granules, an anterior one consisting of enlarged conical granules of which the

middle pair are a little larger than the remaining ones, a posterior one consisting of small round granules; area V with a single row of larger granules; free tergites matt, I-II with 1 row, III with 2 rows of enlarged granules; all the larger conical granules of dorsal surface tipped with white setae, the regular and close-set rows of setae giving the animal a hirsute appearance; sternites with 2 rows of seta-tipped small round granules; coxae smooth and shiny with scattered white

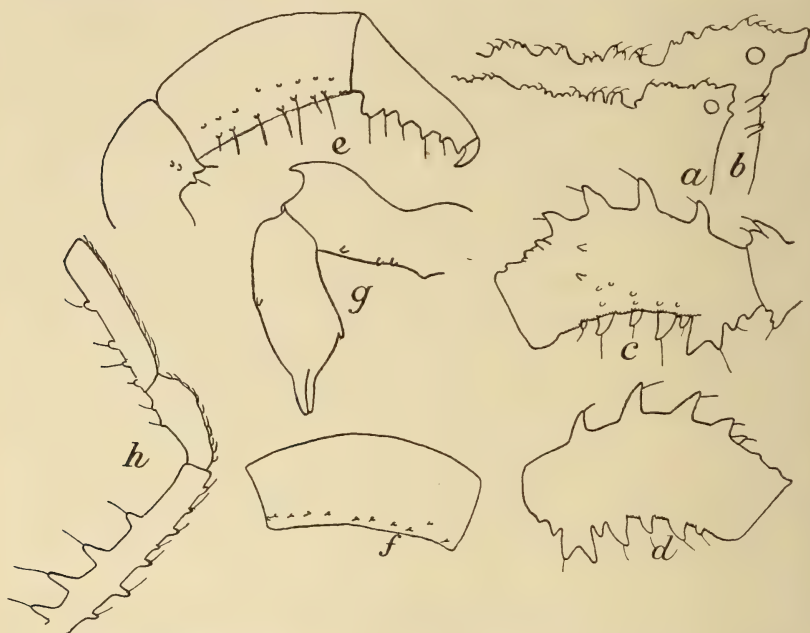


FIG. 19.—*Ceratomontia setosa*. a, ocular tubercle, ♀; b, ocular tubercle; c, femur of palp from inner; d, from outer side; e, patella-tarsus of palp from outer side; f, tibia of palp from inner side; g, chelicera; h, leg I, all of ♂.

setae, coxa I with 2 teeth along its anterior margin, the proximal one larger and rounded, the distal one bifid.

Pedipalp: femur as in fig. 19, c, seen from inner side, trochanter with 2 teeth on upper surface, the larger one not exceeding the largest of the 4 teeth on dorsal surface of femur, seen from outer side (fig. 19, d), inferior outer side with a large basal bifid tooth and 4-5 smaller teeth, a median strip of fine granulation flanked on inner side by some low round granules; patella below on outer side with 2, on inner side with 1 small granule; tibia on outer side as in fig. 19, e, on inner side as in fig. 19, f; tarsus on outer side as in fig. 19, e, inner side with

4-5 teeth; chelicera without a dorsal tooth in the middle of segment I but as in fig. 19, *g*; leg I with femur, patella, and tibia as in fig. 19, *h*; remaining legs unarmed but fairly densely covered, especially in distal segments, with short white hairs, those on tarsal segments of legs II-IV long and slender; tarsal segments 2:3:3:3.

Measurements.—Total length 2·8, pedipalps 3·2 mm.

♀, with ocular tubercle as in fig. 19, *a*, seen from the side, terminal process shorter than in ♂; anterior margin of carapace with 3 conical granules on each side of ocular tubercle (not shown in fig. 19, *a*); white setae on sternites and coxae more numerous than in ♂; patella of pedipalp below with a larger inner tooth than in ♂; tibia on inner side below with an irregular double row of granules, the outer of these consisting of 5 fairly large tooth-like granules, outer side with a single row of about 9 granules larger than those of the ♂; tarsus on inner side with 3 larger alternating with 2 smaller teeth, outer side with 4 or 5 teeth, the basal one large and divided at the tip; genital operculum proportionately broader than in ♂; granulation of body, armature of leg I, pedipalp, femur, etc., as in ♂.

Measurements.—Total length 2·6, pedipalps 2·8 mm.

Types, 1 ♂, 1 ♀, Goqwana, Tsolo, Eastern Cape Province. Types in Albany Museum, Grahamstown.

Gen. MENSAMONTIA n. gen.

Enlarged granules of the dorsal scute and free tergites moruliform and surmounted with a small curved claw-like seta (fig. 20, *i*), some of the granules on each side of and in front of the ocular tubercle peculiarly modified, provided with a short stalk, the distal enlarged and flattened portion being rosette-like (fig. 20, *j*); ocular tubercle produced into a single fairly acute spine; stigmatae hidden; segments of pedipalp with very long and strong teeth which are provided at the tip with a very stout seta or spine and a claw-like spur, fig. 20, *h*; femur of leg I with very long spines inferiorly, remaining legs unarmed; calcaneus of all legs much shorter than astragalus; tarsal segments I, 3; II, 8-9; III, 4; IV, 4; median prong of claws of tarsi III and IV much stouter than lateral prongs, fig. 20, *c*.

Two species, Western Cape Province.

Key to species.

1. I-II areas with a transverse row of about 10 enlarged granules, size of body 3·7 mm. *morulifera*, p. 382.
- I-II areas with a transverse row of 2-4 enlarged granules, size of body 2 mm. *melanophora*, p. 383.

Mensamontia morulifera n. sp.

(Text-fig. 20, a-j.)

Colour.—Body brown, legs yellow; anterior margin of carapace and area surrounding the ocular tubercle but not the tubercle itself

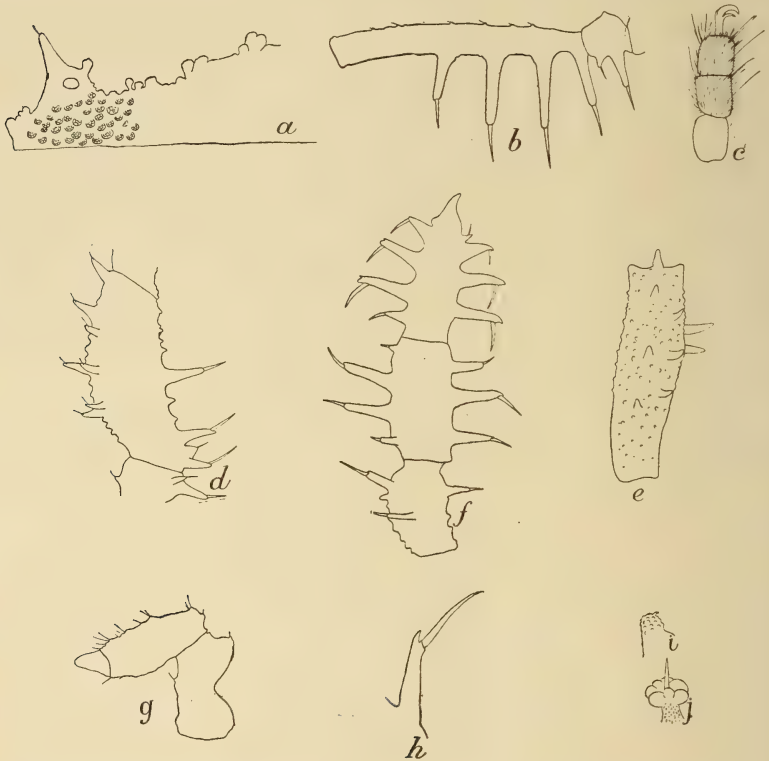


FIG. 20.—*Mensamontia morulifera*. *a*, ocular tubercle; *b*, femur of leg I; *c*, tarsus IV; *d*, femur of palp from side; *e*, from above; *f*, patella-tarsus of palp from below; *g*, chelicera; *h*, spine of tibia; *i*, moruliform; *j*, rosette-like granules of dorsal scute.

with mushroom-shaped, rosette-like granules as in fig. 20, *j* (seen from above and enlarged); ocular tubercle seen from the side as in fig. 20, *a*, a moruliform granule posterior to the main spine; areas of dorsal scute each with a transverse row of enlarged club-shaped moruliform granules (fig. 20, *i*) (seen from the side and enlarged), interspaces of these areas filled up with regularly spaced small round granules; fifth area with a strip of matt granulation behind the transverse row

of enlarged granules composed of finer and denser granulation than that of the region in front of the transverse row of granules; free tergites with a similar posterior strip of matt granulation, I with a single transverse row of enlarged granules, II with 1 complete and 1 incomplete row, III with more than 1 row; sternites finely shagreened with an anterior row of granules far smaller than those of the tergites; coxae finely shagreened, I with 5-6 teeth along its anterior margin similar to but much shorter than those of femur I, II with a row of small granules in the middle of its inferior surface, a large tooth and 2-3 smaller ones on its posterior distal margin. Pedipalp with long, stout teeth bearing a stout seta at their tips resembling a second segment, and ending above in a claw-like spur (fig. 20, *h*); these teeth especially long on the tibia and tarsus (laterally) and on the femur (inferiorly); femur seen from above (fig. 20, *e*), with scattered round granules giving it a rugose appearance and 2 rows of 4 and 3 teeth; seen from the outer side as in fig. 20, *d*, with a large bifid tooth below near the base and 2 other large teeth; patella, tibia, and tarsus seen from below as in fig. 20, *f*; chelicera as in fig. 20, *g*, seen from the side; femur and trochanter of leg I as in fig. 20, *b*; trochanter with 3 teeth below (only 2 shown in fig.), one of which is large; tarsal segments I, 3; II, 8; III, 4; IV, 4; claw of tarsus of leg IV as in fig. 20, *c*.

Measurements.—Pedipalp 4, length of body 3.7 mm.

Type and genotype, 1 specimen, Table Mountain, Cape Town.

Two specimens from Sir Lowry's Pass, Caledon.

Mensamontia melanophora n. sp.

(Text-fig. 21, *a-f*.)

Colour dark olivaceous brown with black infuscations especially on the posterior tergites, legs coloured similarly to trunk; the mushroom-shaped rosette-like tubercles are fewer in number and smaller than those in *M. morulifera*, there being a few scattered ones on each side of the ocular tubercle, just posterior to it, and along the anterior margin of the carapace, ocular tubercle seen from the side as in fig. 21, *b*; dorsal scute thickly and homogeneously covered with round medium-sized granules, not divided into areas by grooves, these represented in the middle of the areas by transverse rows of enlarged moruliform granules, the number of 2-3 in area I increasing successively to about 8 in area IV; I and II free tergites with a row of similar granules anteriorly, the remainder of the segments with

finer granulation, III tergite with more than 1 irregular row of granules; sternites with fine scale-like granulation and an anterior row of about 12 indistinct round smooth granules; coxae below finely granular, coxa I with its anterior margin provided with 4 seta-tipped teeth. Pedipalp seen from below as in fig. 21, *f*, trochanter with 2 large teeth below (the one bilobate) and 1 small one; femur seen from the outer side rugose (fig. 21, *e*); patella, tibia, and tarsus seen from below as in

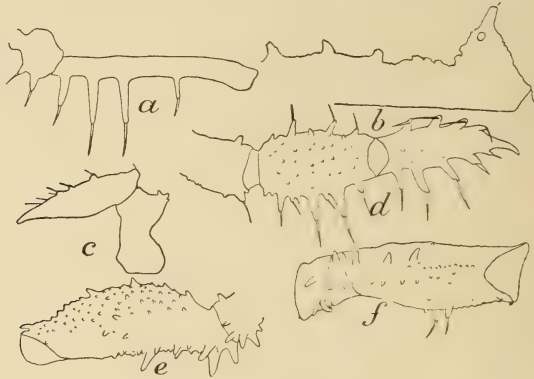


FIG. 21.—*Mensamontia menanophora*. *a*, femur of leg I; *b*, ocular tubercle; *c*, chelicera; *d*, patella-tarsus of palp from below; *e*, femur of palp from outer side; *f*, from below.

fig. 21, *d*; chelicera as in fig. 21, *c*; femur of leg I as in fig. 21, *a*; tarsal segments I, 3; II, 8–9; III, 4; IV, 4.

Measurements.—Length of body 2–2.2 mm.

Types, 12 specimens from Bredasdorp, Cape Province. All specimens show armature of the first femur below; the species differs from *morulifera* in its distinctly smaller size, darker colour, and the markedly fewer rosette-like granules on the anterior portion of carapace.

Gen. ROEWERIA n. gen.

Resembling *Mensamontia* in the number of the tarsal segments which are I, 3; II, 9; III, 4; IV, 4; differing from *Mensamontia* in that the median prong of claws of tarsi III and IV is shorter and weaker than the lateral prongs (fig. 22, *g*); moruliform and rosette-like granules absent, dorsum of body without armature, uniform matt with a few round smooth granules; ocular tubercle smooth with a single long spine distally; stigmæ hidden; coxa I with 2 stout

conical tubercles at its anterior distal apex; pedipalp armed with short blunt teeth or low round granules; II segment of chelicerae with a row of small tooth-like granules on its inner side; femora of all legs unarmed inferiorly, calcaneus of all legs much shorter than astragalus; terminal section of tarsus I 2-jointed, II 3-jointed.

One species, Western Cape Province.

Roeweria inermis n. sp.

(Text-fig. 22, a-g.)

Colour yellow; body with matt granulation, the individual granules distinct and bead-like; ocular tubercle as in fig. 22, a;

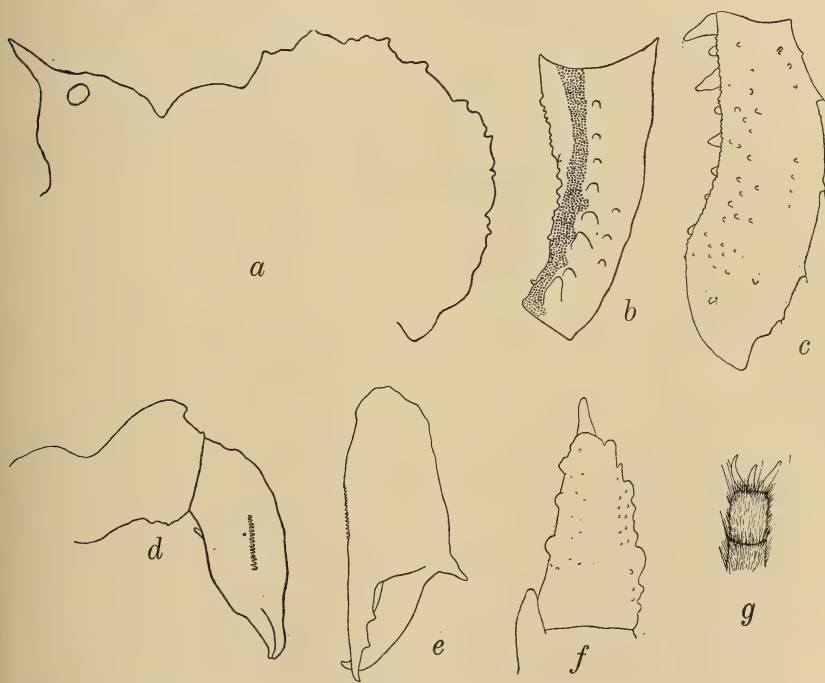


FIG. 22.—*Roeweria inermis*. a, ocular tubercle; b, femur of palp from below; c, from inner side; d, chelicera; e, anterior surface of segment II of chelicera; f, tibia-tarsus of palp below; g, tarsus IV.

dorsal scute divided into areas by distinct grooves only in the middle, areas I and II with a pair of large round smooth granules in the middle, III with 6, IV with 4, the median pair larger than the rest; posterior

margin of dorsal scute with about 6 similar granules in the middle; free tergites with a single row of similar granules, sternites with a row of smooth round granules; coxae shiny, I with 2 large conical tubercles at its distal anterior apex, I and II with a row of smooth granules in the middle of the inferior surface, inferior surfaces of all coxae with a granular patch at their distal apices, posterior distal apex of II and anterior distal apex of IV with a tooth and 4 smaller conical granules. Pedipalp: femur seen from below and from the side as in figs. 22 *b, c*; below an outer row of smooth blunt teeth not as large as in other genera, a median strip of bead-like granules, and some irregularly-placed small round granules on the inner side; femur above with 5 small teeth; patella unarmed, tibia with an irregular row of small round granules on each side, smooth in the middle, unarmed except for a large prominent tooth (fig. 22, *f*) at the inner distal apex; tarsus as in fig. 22, *f*, no long conical teeth but low rounded tubercles on the outer side, stout short teeth on the inner side; claw short and stout; chelicera as in fig. 22, *d*, segment II seen from in front (fig. 22, *e*), with a prominent tooth on the outer side at the base of the movable finger of claw; the inner side with a row of about 14 small tooth-like granules (fig. 22, *d*); legs unarmed, with rows of small granules, tarsal segments 3:9:4:4; claw of tarsus IV as in fig. 22, *g*.

Measurements.—Length of body 3·4 mm.

Type and genotype, 1 specimen, Newlands, Cape Town.

Gen. *AMATOLA* n. gen.

Tarsal segments I, 3; II, 5; III, 4; IV, 4; dorsal scute smooth without grooves defining the I–IV areas or carapace, no armature or granules; a distinct lateral and indistinct posterior groove; anterior margin of carapace with a row of peculiar club-shaped granules (fig. 23, *a*); ocular tubercle low with a very short process (fig. 23, *b*); coxa I below with 2 blunt teeth at its anterior distal border; stigmæ hidden; pedipalps moderately armed, chelicerae unarmed; legs comparatively short and stout, calcaneus of all legs much shorter than astragalus; femur of leg I unarmed, similar to remaining femora; lateral prongs of claws of tarsi III and IV shorter and much slenderer than median prong.

One species, Eastern Cape Province.

Amatola dentifrons n. sp.

(Text-fig. 23, a-h.)

Colour light brown, appendages yellow; dorsal scute without transverse grooves defining areas I-IV and carapace, a distinct lateral and faint posterior groove present; dorsal scute with homogeneous matt granulation, without enlarged granules or spines, 2 short transverse rows of small obsolete granules posteriorly and

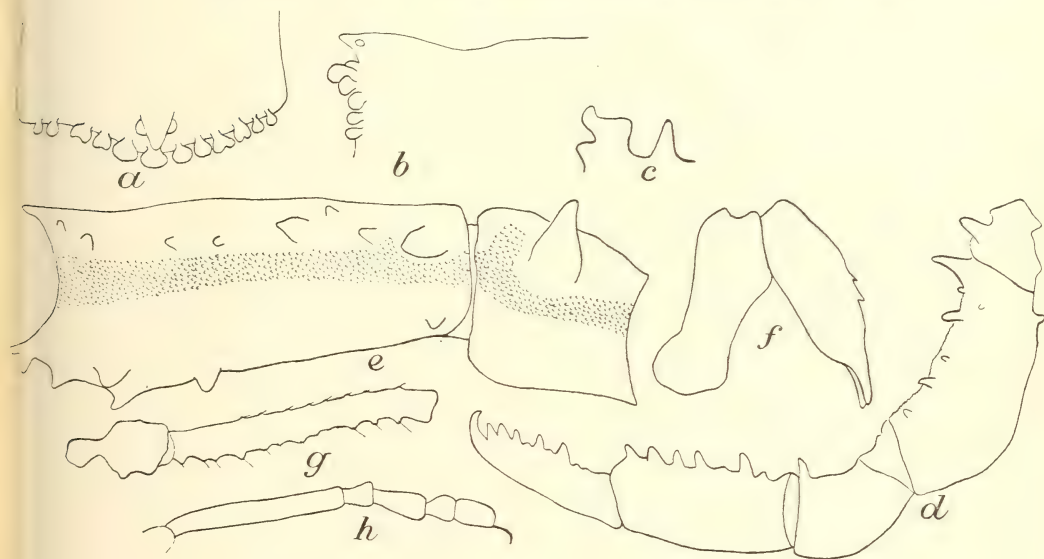


FIG. 23.—*Amatola dentifrons*. *a*, ocular tubercle from above; *b*, from side; *c*, anterior apex of coxa I; *d*, palp from outer side; *e*, femur of palp below; *f*, chelicera; *g*, femur; *h*, tarsus of leg I.

posterior border with a transverse row of small granules; free tergites with a row of granules similar to those of the posterior border of dorsal scute; anterior margin of carapace as in fig. 23, *a*, with a row of 11 semi-divided rounded granules; ocular tubercle seen from the side as in fig. 23, *b*; sternites with rounded granules only at the sides, stigma-bearing sternite anteriorly with 2-3 enlarged tooth-like granules meeting some similar granules on the posterior margin of coxa IV; pedipalp seen from the outer side as in fig. 23, *d*, from below as in fig. 23, *e*; trochanter with a particularly large tooth below, larger than the first basal tooth of the femur, both femur and trochanter with a median strip of fine granulation; patella below with a small

inner tooth in the middle and a larger one at distal outer apex, tibia with 4 inner, 5 outer lateral teeth, tarsus with 5 teeth on each side; chelicera as in fig. 23, *f*, a moderate tooth near the distal outer apex of segment II (not shown in fig.); femur of leg I as in fig. 23, *g*, tarsus of leg I as in fig. 23, *h*; coxae below without granules, smooth, coxa I with a sharp tooth on the anterior margin in the middle and a bifid tooth-like process at distal apex (fig. 23, *c*), coxa II with a row of 4 curved tooth-like granules along distal posterior margin, coxa IV with 3 similar granules along its anterior distal margin as well as those on its posterior margin described above. Tarsal segments I, 3; II, 5-6; III, 4; IV, 4.

Measurements.—Length of body 4.5, breadth 3.3, pedipalps 5.8 mm.

Types and genotypes, 2 specimens, Hogsback Mountains, Cape Province.

Gen. ROSTROMONTIA n. gen.

Carapace well defined; a groove passing just anterior to the ocular tubercle, the latter situated in the anterior half of carapace; dorsal scute divided into areas by well-defined grooves passing right across the scute and meeting a lateral groove at the sides; dorsal scute unarmed, granules when present on areas arranged in 2 rows, free tergites with 1 row; coxa I usually with 2 blunt tubercles at its anterior distal border; stigmatae hidden; pedipalps, especially tibia and tarsus; not strongly armed; calcaneus of all legs much shorter than astragalus; median prong of claws of tarsi III and IV much stouter than the lateral prongs; tarsal segments I, 3; II, 5; III, 4; IV, 4.

Four species, Western Cape Province.

Key to species.

1. 3 terminal segments of tarsus III as broad as or broader than long (fig. 26, *d*) *capensis*, p. 394.
 3 terminal segments of tarsus III longer than broad (fig. 27, *d*) 3.
2. Areas I-IV with 2 rows of granules, anterior margin of coxa I with 2 stout conical teeth *lisposoma*, p. 392.
 Areas I-IV without rows of granules, anterior margin of coxa I without 2 stout conical teeth *granulifer*, p. 391.
3. Femur of pedipalp with 3 sharp teeth above *truncata*, p. 389.
 Femur of pedipalp with 2 sharp teeth above

Rostrontia truncata n. sp.

(Text-fig. 24, a-h.)

♂. *Colour* light brown, pedipalps, chelicerae, and tarsi of legs yellow brown; anterior margin of carapace with 2 rows of about 3 granules each; ocular tubercle seen from the side as in fig. 24, b, with some small smooth scattered granules on its posterior slope, carapace behind ocular tubercle with 2 short longitudinal rows of about 3 granules each, divided by a short cleft; areas of dorsal scute each with an anterior row of enlarged granules and a posterior row of small ones (fig. 24, a), the middle pair of the row of enlarged granules a little larger than the rest; posterior border of dorsal scute and free tergites with one row of enlarged granules provided at their tips with setae; stigma-bearing sternite with an irregular double row of round granules at the sides, remaining sternites matt with an anterior row of small smooth granules; inferior surfaces of coxae smooth, II-IV in the middle with a row of small shiny granules, anterior margin of coxa I with 2 stout conical tubercles, the distal one bifid, coxa II with a large club-shaped granule at its posterior distal apex. Pedipalp: trochanter with 1 tooth below on the outer side; femur above with 2 pointed teeth and 2 round shiny granules near the base, femur below as in fig. 24, c, an irregular double row of teeth on the outer side, some small bead-like granules on the inner side, between these a strip of bead-like granulation; patella with a small tooth near distal outer apex and in addition a row of 3-4 small granules on each side, between them a short strip of bead-like granulation similar to that of the femur; tibia on inner side with an irregular row of about 15 shiny round granules and 2 tooth-like granules near apex, on outer side an irregular double row of small round granules, between them a narrow strip of bead-like granulation which tends to form short transverse ridges distally; inner side of tarsus with 3 distinct teeth, outer side with a ridge of blunt confluent granules (fig. 24, d); chelicera as in fig. 24, h, a blunt bifid round granule at the superior apex of segment I, segment II with 3 tooth-like granules in the distal half of the anterior surface, a row of 3 tooth-like granules on the outer surface near its distal apex. Legs: femur I as in fig. 24, e, tarsus I as in fig. 24, f, tarsus II as in fig. 24, g, tarsal segments of III and IV short and stout, usually broader than their own tibiae and certainly broader than the tarsal segments of leg II; tarsal segments I, 3; II, 5; III, 4; IV, 4.

Measurements.—Length of body 4, pedipalps 5.5 mm.

♀. As in ♂ with the following differences: a lateral row of about

6 granules at the base of the ocular tubercle; pedipalp smaller in proportion to body than in ♂, patella with 3 blackish granules on

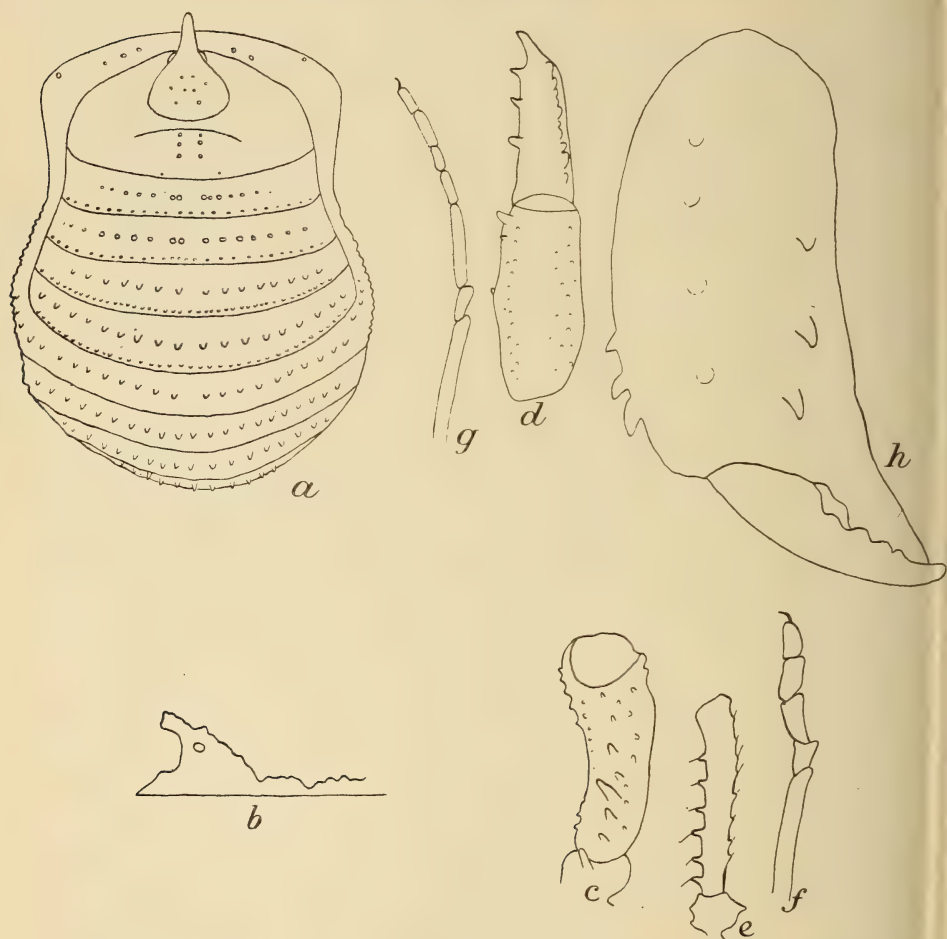


FIG. 24.—*Rostromontia truncata*. a, dorsal surface; b, ocular tubercle; c, femur of palp below; d, tibia-tarsus of palp below; e, femur of leg I; f, tarsus I; g, tarsus II; h, anterior surface of segment II enlarged.

inner side, 1 on outer side, between these some smaller granules and a granular bead-like strip; tibia with 4 tooth-like granules on inner, 6 on outer side, these granules seta-tipped and pointed, distinctly larger than the other rounded granules at the sides of the segment, inferior surface with coarse ridges; tarsus as in ♂; segment II of chelicera with a row of 3 tooth-like granules on anterior surface near

apex but these smaller than in ♂, outer surface without 3 tooth-like granules near distal apex, segment I with 2 small round granules at superior distal apex.

Measurements.—Length of body 3·9, pedipalps 4·5 mm.

Types, 4 ♂♂, 2 ♀♀, Witte River, Wellington, Cape Province.

Rostromontia granulifer, n. sp.

(Text-fig. 25, a-c.)

♂. Colour in general blackish-brown, tarsal segments of legs olive green, the joints yellowish; chelicerae, pedipalps, and carapace with



FIG. 25.—*Rostromontia granulifer*. a, ocular tubercle; b, leg I; c, femur of palp below.

distinct black reticulate markings; closely resembling *R. truncata*, the granules of dorsal scute and free tergites larger, ocular tubercle somewhat differently shaped (fig. 25, a), with a row of small granules only in the middle of the posterior surface of tubercle; carapace behind ocular tubercle with 2 oblique or transverse rows of 5-6 granules each, the cleft between them broadly **Λ**-shaped; granules of areas and free tergites as in *R. truncata* but stouter, sternites as in *truncata*; coxae II-IV with more definite and larger granules than in

truncata, coxa IV with 5 granules along its posterior margin growing successively larger distally and projecting over the cleft between coxa IV and stigma-bearing sternite. Pedipalp: femur much deeper than wide and strongly flattened from side to side with 3 distinct sharp teeth above and 1 small round granule near the base, below as in fig. 25, *c*; patella, tibia, and tarsus resembling *truncata*; chelicera as in *truncata*, segment I ending distally above in a blunt tooth, segment II with tooth-like granules similar to those of *truncata* but stronger. Leg I as in fig. 25, *b*, tarsal segments of III and IV short and stout; tarsal segments I, 3; II, 5; III, 4; IV, 4.

Measurements.—Length of body 3·8, pedipalps 5·7 mm.

♀. As in ♂ but differing in the following particulars: ocular tubercle with a lateral row of 7–8 granules at its base; pedipalp: patella with a tooth-like granule at its inner, not its outer, distal apex; tibia with 4 seta-tipped teeth and some smaller granules on the outer side, 3–4 teeth on the inner side, inferior surface of tibia with coarse transverse ridges; tarsus as in ♂; chelicera as in ♂, the II segment, however, without 3 tooth-like granules on its outer surface near the apex; femur of leg I not armed inferiorly or with 1–2 low seta-tipped tubercles. The ♀ can be distinguished from the ♂ most readily by the armature of the tibia of the pedipalp which is distinctly stronger than in the ♂; the pedipalps in proportion to the body are noticeably smaller than in the ♂.

Measurements.—Length of body 3·7, pedipalps 4·3 mm.

Types, 1 ♂, 1 ♀, Kalk Bay, Cape Town. Other specimens: 2 ♂♂, 1 ♀, Blinkwater Ravine, Table Mountain; 1 ♂, Newlands, Cape Town.

Rostrumontia lisposoma n. sp.

(Text-fig. 26, *a–f*.)

♂. *Colour* yellow. Carapace defined posteriorly by an incomplete procurved groove; ocular tubercle large, blunt (fig. 26, *a*); whole of dorsal surface of body with fine matt granulation, no spines but a few minute granules; areas of dorsal scute defined by grooves passing across the scute to meet a lateral groove; posterior margin of dorsal scute and free tergites with a transverse row of minute, barely discernible seta-tipped granules; sternites matt, posterior ones with 1–2 rows of setae; coxae matt, I and II with inferior surfaces covered with irregularly placed round granules, especially distally, anterior margin of I without 2 large conical tubercles, II with an enlarged tooth-like granule at its posterior distal apex, III with a row of small round granules along its posterior and anterior margins, IV with a similar

row along its posterior margin, inferior surface of IV without granules. Pedipalp seen from inner side (fig. 26, *c*) ; trochanter with 1 large outer and 1 small inner tooth ; femur strongly granular on the inner surface,

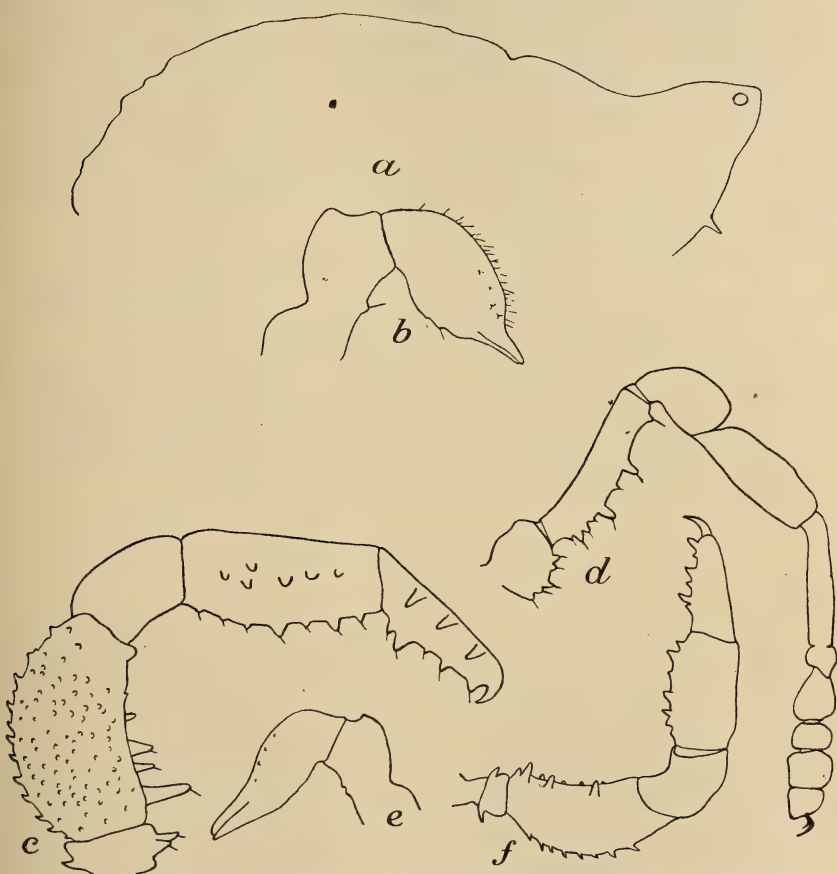


FIG. 26.—*Rostromontia lisposoma*. *a*, ocular tubercle; *b*, chelicera; *c*, palp from inner side; *d*, leg III, all of ♂; *e*, chelicera; *f*, palp from outer side of ♀.

smooth on the outer surface, below with 4 strong teeth on the outer side, the first longer and stronger than the rest, on the inner side 1 small tooth opposite the large outer basal tooth and a large tooth near the middle, median strip of bead-like granulation absent ; patella unarmed, tibia and tarsus as in fig. 26, *c* ; chelicera as in fig. 26, *b*, a few indistinct granules on its anterior surface ; femora of all legs armed inferiorly with a row of granules, those of III (fig. 26, *d*) conical and

distinctly longer than in the other legs, tarsal segments of III very short and stout; tarsal segments I, 3; II, 5; III, 4; IV, 4.

Measurements.—Length of body 4.5, pedipalps 5.2 mm.

♀. As in ♂ with the following differences: teeth on inferior surface of femur of pedipalp much smaller, about half the size of those of the ♂; inner surface of femur matt, a patch of granules at distal apex but not elsewhere, outer surface smooth; femur of leg III similar to that of ♂ with 3–4 conical granules inferiorly larger than those of remaining legs; pedipalps much smaller in proportion to body than in ♂. Figs. 26, *f*, *e*, represent respectively the pedipalp and chelicera of a ♀ from Swellendam.

Measurements.—Length of body 4.3, pedipalps 4 mm.

Types, 1 ♂, 2 ♀♀, Newlands, Cape Town. Other specimens: 3 ♀♀, Constantia, Cape Town; 3 ♀♀, River Zonder End, Swellendam; 1 ♀, Hottentots Holland Mountains; 1 ♀, Swellendam.

This species resembles the North American form *Sclerobunus robustus* Packard in the absence of body armature and the spination of the pedipalp, especially the dorsal surface of the femur, see figs. 746, *a*, *b*, p. 596, Die Weberknechte der Erde, Roewer.

Rostrumontia capensis n. sp.

(Text-fig. 27, *a–h*.)

♂. *Colour* yellow brown; ocular tubercle and outline of carapace as in fig. 27, *c*, a row of small granules laterally to and in front of ocular tubercle, ocular tubercle with a number of small granules on its posterior surface and sides; the first 4 areas each with a transverse row of granules in the middle and a row of minute granules along its posterior border, area V and free tergites with only the one row of larger granules in the middle; whole of dorsal surface of body with a background of fine matt granulation; sternites matt with a single transverse row of small granules in the middle, coxae shiny with some rather indistinct transverse rows of granules in the middle, I with 2 large conical teeth at anterior distal apex. Pedipalp seen from inner side (fig. 27, *a*); trochanter with a small tooth above and below; femur with 3 large teeth above and 2 (sometimes 3) much smaller conical ones near the basal one but situated more mesially, below with 4 large teeth on the outer side, some small round shiny granules on the inner side, between these a median row of fine bead-like granules; patella unarmed except for a blunt tooth at its distal outer apex; tibia not armed with teeth but an irregular row

of about 11 small low granules extending almost the whole length of inner side, outer side with about 4-6 similar granules; tarsus as in fig. 27, *b*; chelicera as in fig. 27, *e*, anterior surface with a sharp tooth near its distal apex, inner surface with 3 teeth, the most distal one round and granuliform. Legs long and slender, femur I with a row of granules inferiorly not much stronger than those of remaining

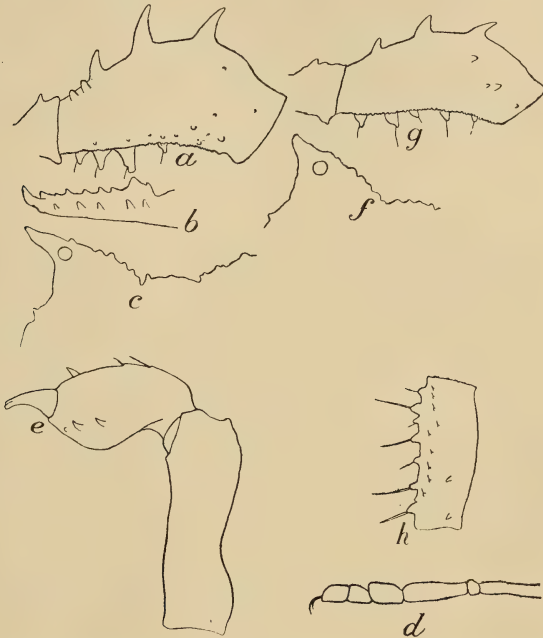


FIG. 27.—*Rostromontia capensis*. ♂: *a*, femur of palp from inner side; *b*, tarsus of palp; *c*, ocular tubercle; *d*, tarsus III; *e*, chelicera. ♀: *f*, ocular tubercle; *g*, femur of palp from inner side; *h*, tibia of palp.

femora; 3 terminal segments of tarsus III (fig. 27, *d*), longer than broad (in the other species of the genus these segments are broader than long); tarsal segments 3:5:4:4.

Measurements.—Length of body 3.2, chelicerae 4.6 mm.

♀. As in ♂ with the following differences: terminal spine of ocular tubercle distinctly shorter (fig. 27, *f*); pedipalp seen from inner side (fig. 27, *g*); the 2 small basal teeth on the inner side of the femur are always absent, the outer row of teeth on inferior surface are much smaller than in ♂; tibia inferiorly with the outer row of granules much larger than in the ♂, tipped with long setae, inner row small

and seta-tipped, tarsus below with more numerous setae than in ♂; chelicera as in ♂ but the granules much smaller.

Measurements.—Length of body 3.1, chelicerae 3.3 mm.

The presence of the 2 small basal teeth on the inner side of the femur is a good means of distinguishing the males; the spine of the ocular tubercle is nearly always longer in the ♂ than in the ♀, though there are a few specimens in which this is not so; as usual, the pedipalps are much larger and stouter in proportion to the body in the ♂ than in the ♀. This is by far the most common Opilionid in the Cape Peninsula, there being about 80 specimens in the Museum's collection from localities in the Peninsula, mostly different parts of Table Mountain.

Types, 6 ♂♂, 7 ♀♀, Newlands, Cape Peninsula.

Gen. *CRYPTOBUNUS* n. gen.

Differing from the other South African genera of *Triaenonychinae* chiefly in that the calcaneus of the I and II legs is longer than the astragalus instead of being much shorter; dorsal scute without armature and without transverse grooves; anterior margin of carapace with 5 conical granules; coxa I below with 1 blunt tubercle at its anterior distal border; stigmatae hidden; pedipalp femur with a median strip of short cylindrical setae below; femur of leg I not armed inferiorly; median prong of claws of tarsi III and IV much stouter than the lateral claws; tarsal segments 3:5:4:4.

One species, Natal.

Cryptobunus setifemur n. sp.

(Text-fig. 28, *a-g*.)

Colour light brown; anterior margin of carapace with 5 conical seta-tipped granules, the middle one situated just anteriorly to the ocular tubercle; ocular tubercle as in fig. 28, *a*, seen from the side, with a short terminal process; whole of dorsal scute covered with fine dust-like granulation without spines or granules except 4 median pairs of obsolete granules in the posterior half; dorsal scute without any indication of transverse grooves but with well-defined lateral and posterior grooves; posterior margin of dorsal scute with a median pair, free tergites with a transverse row of obsolete granules; sternites matt; coxae with their inferior surfaces without granules but not shiny, coxa I with a large tubercle at its anterior distal apex, II with 5-6 rounded granules along its posterior distal margin, IV with 3-4 similar granules along its anterior distal margin and 2-3 longer club-

shaped granules at its posterior distal margin projecting backwards to meet 2-3 similar granules at the sides of the stigma-bearing sternite;

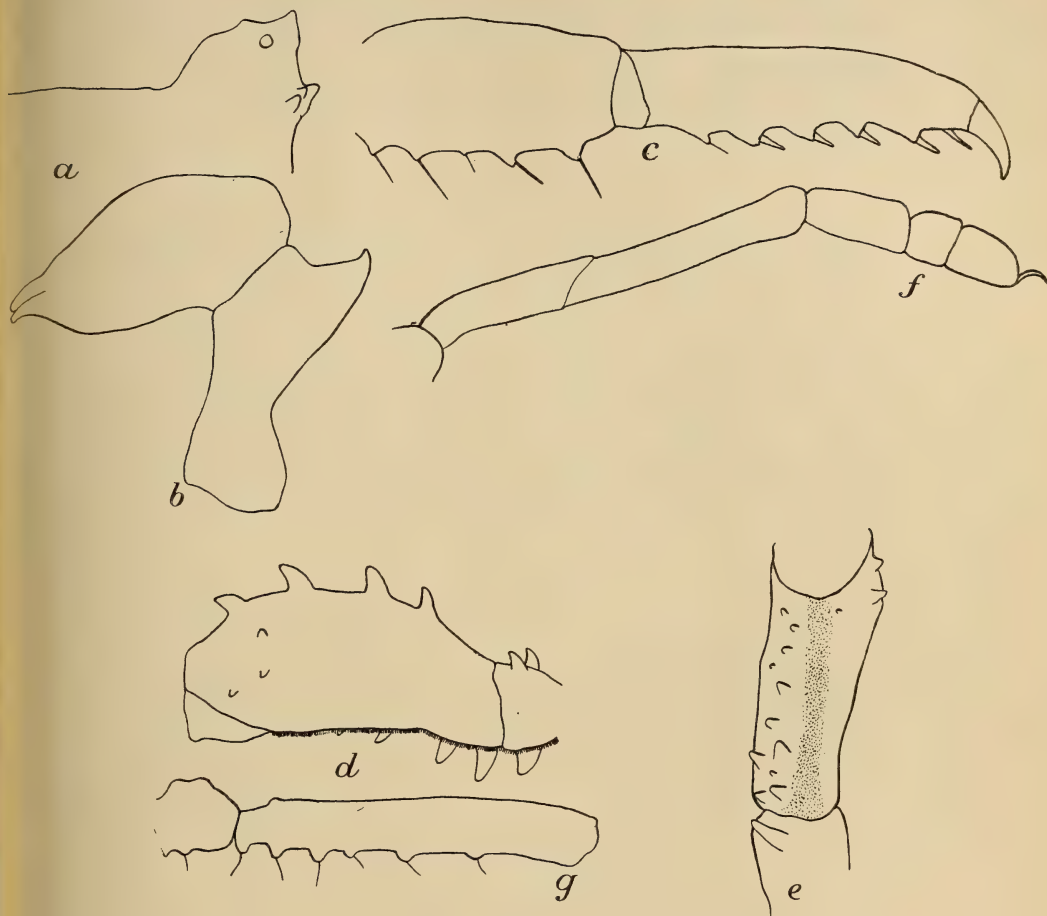


FIG. 28.—*Cryptobunus setifemur*. *a*, ocular tubercle; *b*, chelicera; *c*, tibia-tarsus of palp; *d*, femur of palp from inner side; *e*, from below; *f*, metatarsus-tarsus of leg I; *g*, femur I.

pedipalp as in fig. 28, *d*, seen from the inner side; trochanter with 2 small teeth above, 1 large one below; femur with 4 teeth above, some small and large teeth on outer side below, none on inner side except at apex, a median strip of fine short cylindrical setae differing markedly from the usual fine bead-like granulation of other genera; femur below as in fig. 28, *e*; patella unarmed, tibia as in fig. 28, *c*, showing the

armature of the inner side, the outer side similar, tarsus as in fig. 28, *c*; chelicera as in fig. 28, *b*; legs: femur I as in fig. 28, *g*, remaining femora unarmed, metatarsus and tarsus of leg I as in fig. 28, *f*, the calcaneus longer than the astragalus, their articulating point not clearly defined; tarsal segments 3 : 5 : 4 : 4.

Measurements.—Length of body 3·6, breadth 2·3, pedipalps 3·3 mm.

Type, 1 specimen, Pietermaritzburg, Natal.

Gen. AUSTROMONTIA n. gen.

Resembling *Rostromontia* in most of its characters but differing therefrom in the second tarsus, having 4 instead of 5 segments; dorsal scute divided by transverse grooves into areas; coxa I below with 2 blunt tubercles at its anterior distal border; stigmæ hidden; chelicerae with the upper surface of segment I ending in a pointed tooth or process; tarsus of leg I consisting of 3, remaining tarsi of 4 segments; calcaneus of metatarsi I and II shorter but not much shorter than astragalus; femur I not armed below; median prong of claws of tarsi III and IV stouter than the lateral prongs.

Three species, Western Cape Province.

Key to species.

1. Femur of pedipalp below with a large compound tooth on the outer side near the base, figs. 30, *a*; 31, *d* 2.
 Femur below without a large compound tooth, the large teeth on the outer side simple and homogeneous, fig. 29, *e* *silvatica*, p. 398.
2. Femur of pedipalp below with a bifid tooth on the outer side near the base
 capensis, p. 400.
- Femur of pedipalp below with a trifid tooth on the outer side near the base
 caledonica, p. 402.

Austromontia silvatica n. sp.

(Text-fig. 29, *a-g*.)

♀. *Colour*.—Body brown, the segments bordered posteriorly with black, appendages brown variegated with black. Body closely and finely beset with small round granules; anterior margin of carapace with 1 seta-tipped granule on each side of the ocular tubercle; ocular tubercle as in fig. 29, *b*, with some round shiny granules on its lateral and posterior slopes more numerous on the posterior slope; area behind ocular tubercle with 3 short medially interrupted rows of round seta-tipped granules, the anterior row consisting of 1, the middle of 3, the posterior of 6 on each side; the 4 areas each with a

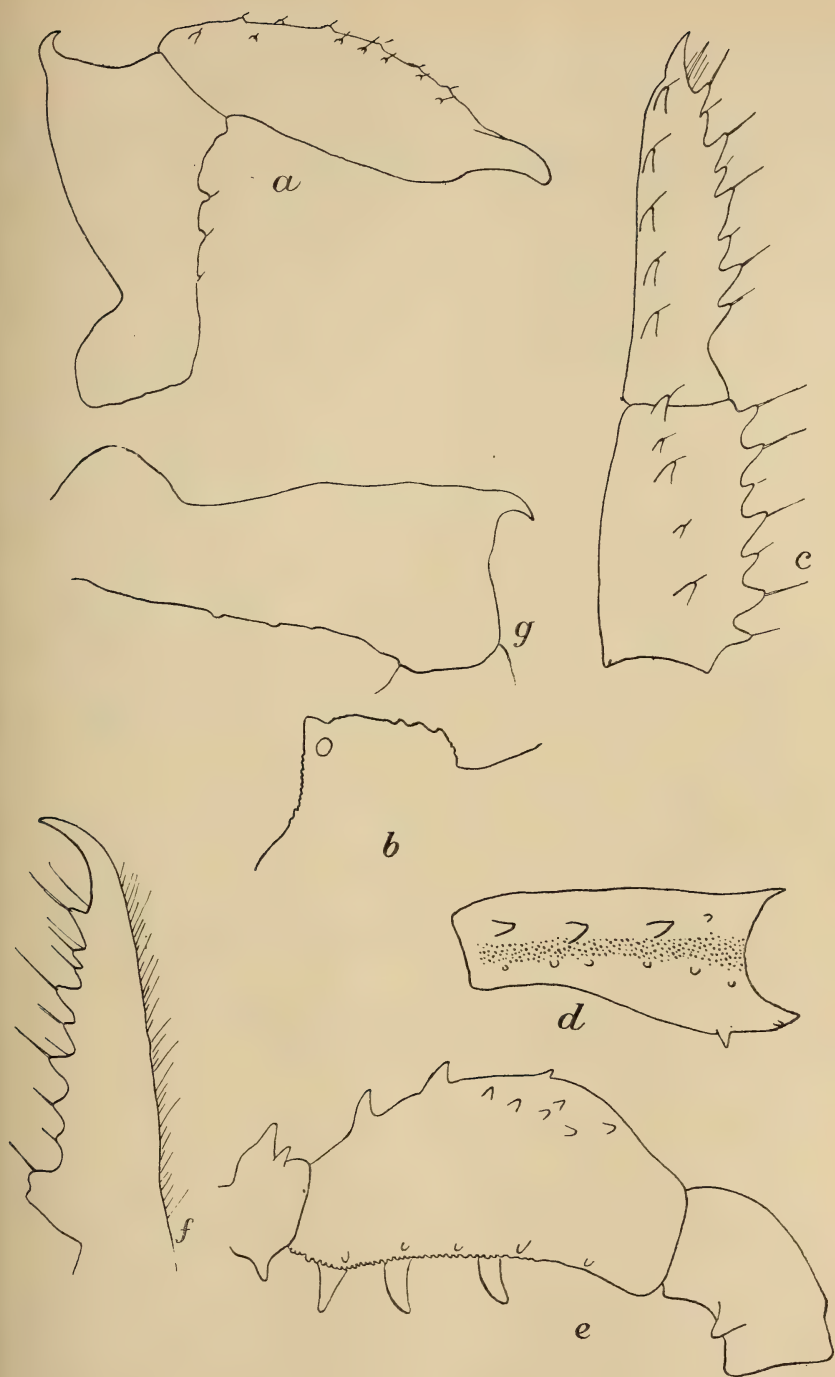


FIG. 29.—*Austromontia silvatica*. ♀: *a*, chelicera; *b*, ocular tubercle; *c*, tibia-tarsus of palp below; *d*, femur of palp below; *e*, from inner side. ♂: *f*, outer side of tarsus of palp; *g*, segment I of chelicera.

posterior bordering row of small granules and a shorter anterior row not reaching the sides and interrupted in the middle; fifth area and free tergite I provided with only 1 middle row, free tergite II with 2 rows; sternites finely shagreened with an anterior row of small round granules; coxae shiny below, without granules, II and IV with a distal patch of fine granulation, that of IV larger than II; coxa I with 2 stout conical tubercles situated along its anterior distal margin. Pedipalp seen from the inner side (fig. 29, *e*), from below (fig. 29, *d*); trochanter with 1 tooth below, 2 above, femur below with 3 large teeth in its proximal two-thirds on the outer side, a row of 5-6 denticles on the inner side, a strip of fine granulation between these rows; femur above with 3 teeth, the distal one smaller than the others and a group of 5 small teeth near the distal inner apex; inner side of femur covered with fine matt granulation, outer side smooth; patella with 1 tooth on the inner side, tibia and tarsus as in fig. 29, *c*; chelicerae as in fig. 29, *a*, segment I with a hooked tooth at its superior distal apex, a saddle-shaped dorsal depression situated well behind the middle of the segment; neither femur of leg I nor those of the other legs armed below; calcaneus of metatarsus I, $\frac{1}{3}$ - $\frac{1}{2}$ the length of astragalus, calcaneus of metatarsus II, $\frac{1}{5}$ - $\frac{1}{4}$ the length of astragalus; tarsal segments 3:4:4:4.

Measurements.—Total length 3.2, pedipalps 3.7 mm.

♂. As in ♀ with the following differences: the terminal process of ocular tubercle slightly longer than in ♀; pedipalps much larger and longer in proportion to the body than in ♀, see measurements below; tibia with smaller teeth, at the sides below, outer side of tarsus as in fig. 29, *f*, inner side with 5 teeth; segment I of chelicerae proportionally longer than in ♀ (fig. 29, *g*).

Measurements.—Length of body 2.7, pedipalps 5.3 mm.

Types, 4 ♂♂, 2 ♀♀, Knysna, Cape Province.

Austromontia capensis n. sp.

(Text-fig. 30, *a-f*.)

Colour yellow brown; anterior margin of carapace with 3 small seta-tipped granules on each side; ocular tubercle as in fig. 30, *e*, seen from the side; area behind ocular tubercle with 2 short longitudinal parallel rows of 3-4 small granules; areas I-IV each bordered posteriorly with a row of small granules, a row of larger seta-tipped granules in the middle (these much fewer in number and not reaching the lateral grooves); area V and free tergites I and II with a single

row of larger granules, III free tergite with 2 rows of granules ; stigma-bearing sternite with a row of setae at each side, remaining sternites

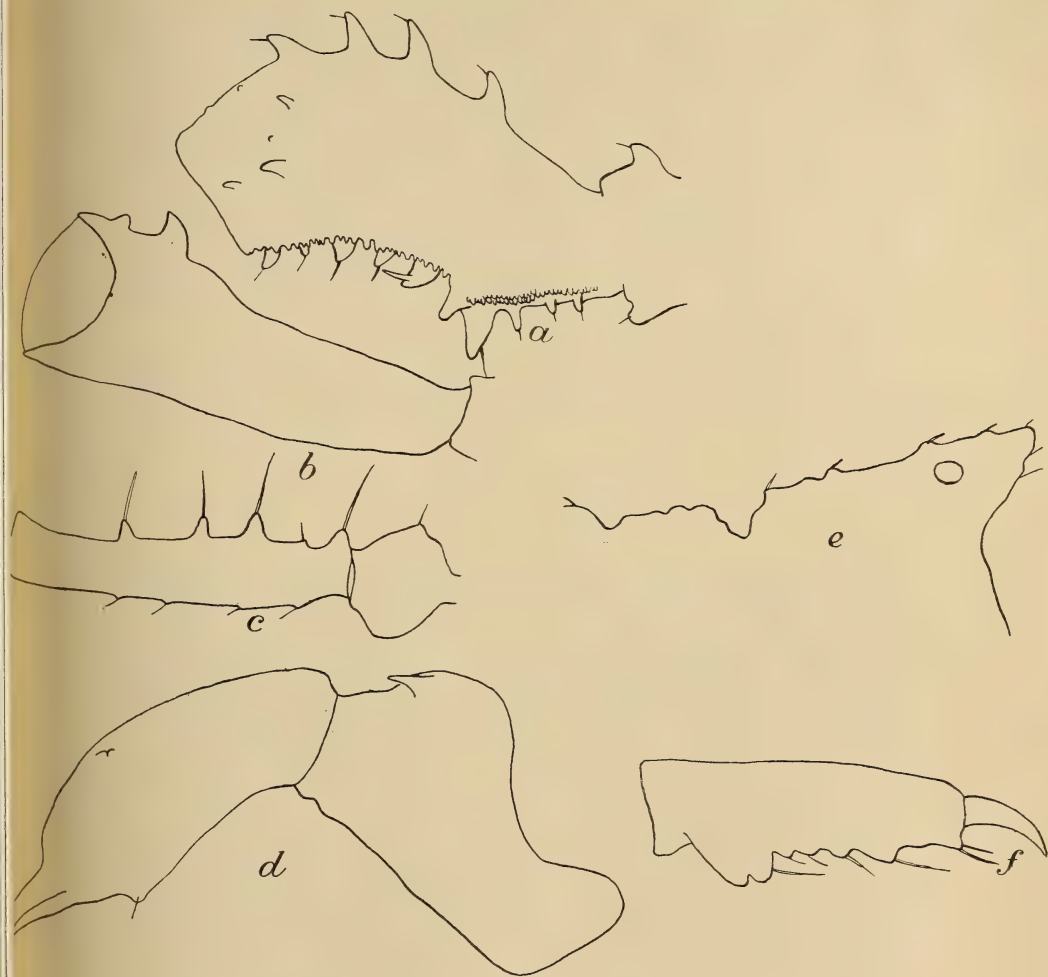


FIG. 30.—*Austromontia capensis*. *a*, femur of palp from inner side ; *b*, from below ; *c*, femur I ; *d*, chelicera ; *e*, ocular tubercle ; *f*, tarsus of palp from outer side.

with an anterior row of obsolete granules ; coxae below smooth and shiny without armature except I, which has two conical tubercles on its anterior distal margin ; genital operculum smooth, broader than long. Pedipalp : femur differing from *A. silvatica* in having a large

bifid tooth near the base on the outer side below, distally to this 5 smaller teeth (fig. 30, *a*), no denticles or enlarged granules on the inner side but the usual strip of bead-like granulation in the middle; inner side of femur with matt granulation and a group of 3 teeth near distal apex, one of these large (fig. 30, *b*, showing outline of femur from below); outer side of femur smooth and shiny; femur above with 4 teeth; patella unarmed, tibia below with some small irregularly placed granules at the sides, 2 teeth near its inner distal apex, tarsus on the outer side as in fig. 30, *f*, on the inner side with 3 teeth; chelicera as in fig. 30, *d*, segment I with a tooth-like process at its superior apex on the inner side, this process directed slightly inwards; femur I armed below as in fig. 30, *c*; calcaneus much shorter than astragalus in metatarsi I and II; tarsal segments 3:4:4:4.

Measurements.—Length of body 3, pedipalps 3.8 mm.

Type, 1 ♀ (?), Platteklip Ravine, Table Mountain. Other specimens: 1 ♀, St James; 2 ♀♀, Newlands, Cape Town.

Austromontia caledonica n. sp.

(Text-fig. 31, *a-d*.)

Colour.—Body olive brown with blackish reticulate infuscation, pedipalps and appendages yellowish brown; anterior margin of carapace with 2 seta-tipped granules on each side; ocular tubercle seen from the side as in fig. 31, *b*, a seta-tipped granule on each side at its base anteriorly, posterior slope in the middle with a row of about 5 seta-tipped round granules; area behind ocular tubercle with 2 short anteriorly converging rows of 3–4 small granules; areas I–IV with a posterior marginal row of small granules, a row of larger seta-tipped conical granules in the middle, the 2 central ones in each row slightly enlarged, these rows consisting of more numerous granules than in *capensis* and reaching or nearly reaching the lateral grooves; fifth area and I and II free tergites with 1, III free tergite with 2 rows of conical granules; stigma-bearing sternite with 1 anterior row of small granules, remaining sternites with 2 rows of similar granules; coxae below smooth and shiny, coxa I with 2 conical tubercles at its anterior distal margin, the distal one bifid; genital operculum smooth, longer than broad. Pedipalp: femur (fig. 31, *d*, seen from inner side) as in *capensis* except that the large basal tooth on the outer side below is trifid, a group of 2 teeth near the apex on inner side, one of these large, above 3 instead of 4 teeth; patella unarmed, tibia with some irregularly-placed granules at the sides, 2 short stout teeth near

the apex and 1 near the base on the inner side ; tarsus as in *capensis* ;
chelicera as in fig. 31, *a*, segment I with 2 moderate teeth above, near

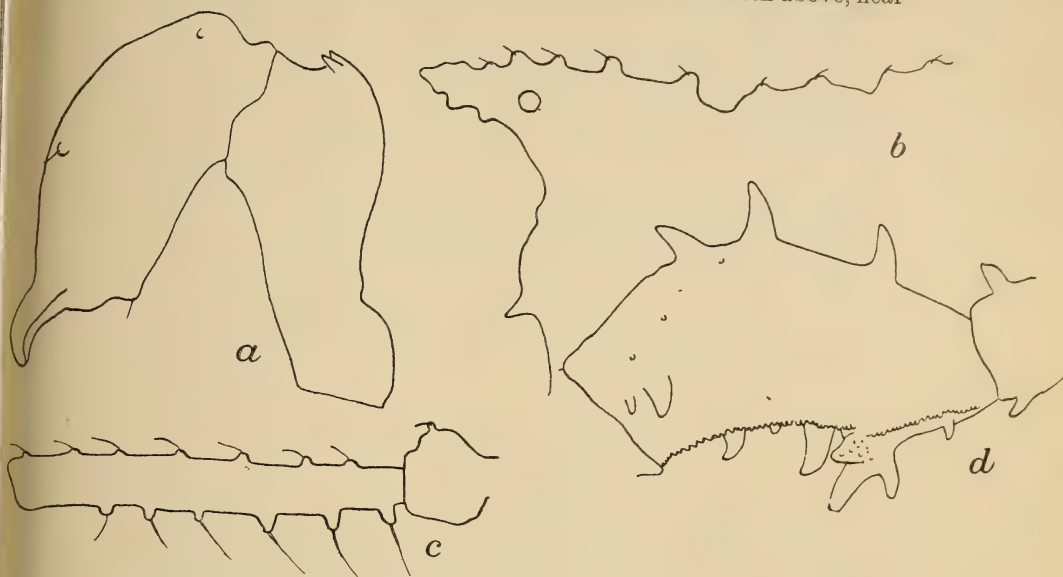


FIG. 31.—*Austromontia caledonica*. *a*, chelicera; *b*, ocular tubercle; *c*, femur I; *d*, femur of palp from inner side.

distal apex ; femur I armed as in fig. 31, *c* ; calcaneus of metatarsi
I and II much shorter than astragalus ; tarsal segments, 3 : 4 : 4 : 4.

Measurements.—Length of body 2·3, pedipalps 3·9 mm.

Type, 1 ♂ (?), Caledon, Cape Province.

Gen. BIACUMONTIA n. gen.

Ocular tubercle with 1 or 2 terminal processes ; dorsal scute divided
into areas by well-defined grooves, a lateral groove present ; armature
of body consisting of a background of small round granules, the areas
of dorsal scute and free tergites with 1 or 2 rows of larger conical
seta-tipped granules ; stigmatae hidden ; coxa I with 2 large tubercles
along its anterior margin ; pedipalp with tibia long and weakly armed ;
segment II of chelicerae with a row of about 17 minute comb-like teeth
on the inner side ; tarsal segments, especially of II, long and slender,
calcaneus of metatarsus I and II long ; median prong of claw of tarsi
III and IV stouter than the lateral claws, tarsus I with 2, II with 4,
III and IV each with 3 segments.

Four species, Cape Province.

Key to species.

1. Ocular tubercle with a posterior spine-like process (fig. 33, *a*), calcaneus of metatarsus II only a little shorter than astragalus *cornuta*, p. 406.
 Ocular tubercle without a posterior spine-like process (fig. 32, *c*), calcaneus of metatarsus II about $\frac{1}{3}$ length of astragalus 2.
2. Areas of dorsal scute with a double row of enlarged granules, teeth on inferior outer surface of pedipalp femur round and truncate (fig. 34, *f*) *truncatidens*, p. 408.
 Areas of dorsal scute with a single row of enlarged granules, teeth on inferior outer surface of pedipalp femur more or less pointed (fig. 35, *c*) 3.
3. Areas of dorsal scute with the middle pair of granules enlarged (fig. 32, *b*), inferior outer surface of pedipalp femur with only 4 large teeth (fig. 32, *g*) *paucidens*, p. 404.
 Areas of dorsal scute with the middle pair of granules not enlarged, inferior outer surface of pedipalp femur with at least 7 large teeth (fig. 35, *c*) *fissidens*, p. 410.

Biacumontia paucidens n. sp.(Text-fig. 32, *a-g*.)

♂. *Colour*.—Legs and trunk yellow brown with blackish infuscations, dorsal scute with a distinct blackish vertebral stripe (sometimes doubled) above, the sides blackish; free tergites I and II black in anterior half, yellow in posterior half, III free tergite black; pedipalps yellow.

Dorsal scute covered with small granules, anterior lateral angles of carapace, posterior surface of ocular tubercle, and segment posterior to ocular tubercle comparatively smooth; ocular tubercle with a rather slender spine, a swollen enlargement posteriorly (fig. 32, *c*); areas of dorsal scute bordered posteriorly by a distinct row of small granules similar to those at the sides of the ocular tubercle, area I with an anterior row in addition, area IV bordered posteriorly with a strip of granules more than 1 deep; areas with a single row of enlarged conical seta-tipped granules, area I with about 4, II with 7, III with 8, IV with the row extending almost the whole width of the scute; the middle pair of these rows larger than the remaining granules in areas I–III, those of IV either not larger or smaller than the remaining granules, area V with a single row of enlarged granules, its posterior half matt; anterior half of free tergites I and II with 2 rows of granules, the anterior one abbreviated, posterior half matt, III free tergite with 2 well-separated rows of enlarged granules; sternites with a row of small round fairly close-set granules in anterior half; coxae as in other species of *Biacumontia*.

Pedipalp : femur as in fig. 32, *g*, seen from outer side, fig. 32, *f*, seen from inner side, a row of 4 large and 3 much smaller pointed teeth on

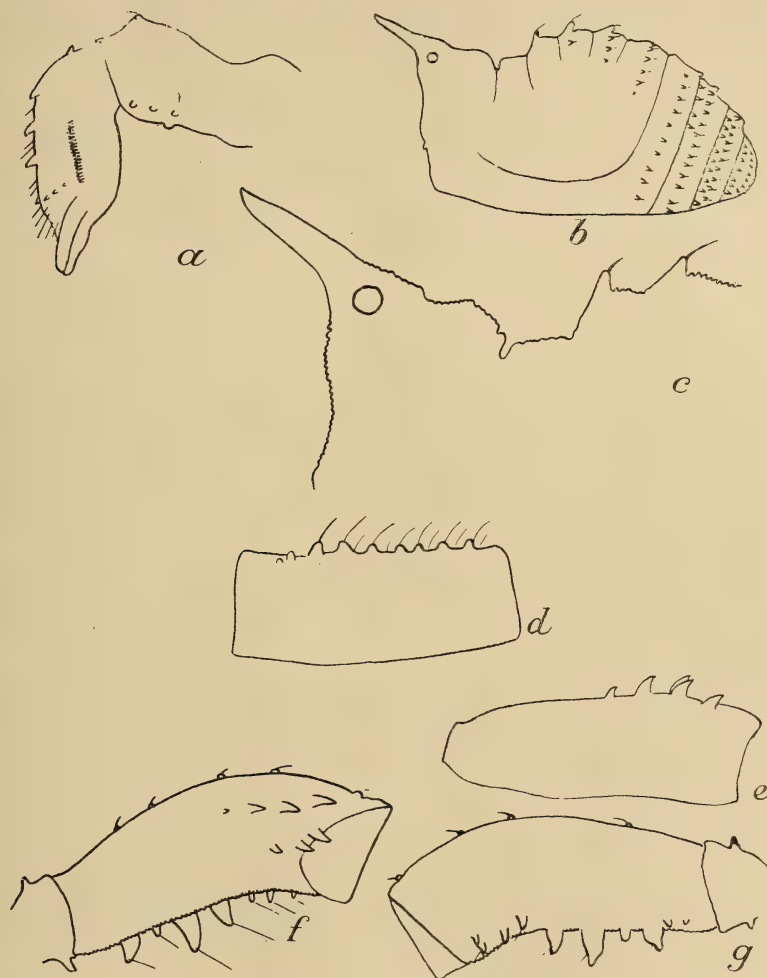


FIG. 32.—*Biacumontia paucidens*. *a*, chelicera; *b*, body from side; *c*, ocular tubercle; *d*, tibia of palp from outer side; *e*, femur of palp from above; *f*, from inner; *g*, from outer side.

outer side below; inner side with 4 sharp subapical teeth near the upper surface, these teeth seen from above as in fig. 32, *e*; upper surface of femur without sharp teeth but with 5 low granules; outer side of tibia as in fig. 32, *d*, inner side unarmed, tarsus with about

4 teeth on each side; chelicera as in fig. 32, *a*, segment I without 2 small sharp teeth near upper apex but instead a small round granule. Legs: calcaneus of metatarsus I about $\frac{1}{2}$ length of astragalus, calcaneus of metatarsus II about $\frac{1}{3}$ length of astragalus; tarsal segments 2:4:3:3.

Measurements.—Total length 2.8, pedipalps 3.5 mm.

♀. Pedipalps smaller in proportion to the body than in ♂; genital operculum wider than long (in ♂ longer than wide); otherwise as in ♂.

Measurements.—Total length 2.4, pedipalps 2 mm.

Types, 3 ♂♂, 5 ♀♀, Stones Hill, Grahamstown, Eastern Cape Province. Types in Albany Museum, Grahamstown.

Biacumontia cornuta n. sp.

(Text-fig. 33, *a-e*.)

♂. *Colour*.—Body and appendages yellow with blackish infuscation, dorsal scute with a longitudinal black stripe down the middle; dorsum of body covered with small tooth-like granules; ocular tubercle with an anterior and posterior spine, the anterior one the longer of the two, the eyes placed at its base; the four areas of dorsal scute each with a median pair of enlarged granules tipped with setae; posterior border of dorsal scute and free tergites I and II with a transverse row of smaller granules in the middle, each tipped with a seta, third free tergite with 2 such rows of granules; sternites finely shagreened with an anterior row of small oval granules tipped with setae; coxae below smooth and shiny except distal fourth of II, a small distal patch of III, and the distal half of IV, which are rugose with small round closely packed granules; coxa I with 2 bifid tubercles on its anterior distal margin, the distal one pointed, the proximal one rounded at its apex; coxa II with 4 club-shaped granules along its posterior distal margin, IV with about 4 similar granules along its anterior distal margin, 6 smaller ones along its posterior distal margin; stigma-bearing sternite with 6 round granules at its lateral anterior border which are larger than the remaining granules of the sternites. Pedipalp: femur seen from the outer side as in fig. 33, *b*, with 8 small denticles above, below armed on the outer side with a row of strong teeth, the usual fine bead-like granulation in the middle; tibia and tarsus not strongly armed below, seen from the side (fig. 33, *d*), with a row of teeth forming a saw-like edge; chelicera seen from the inner side as in fig. 33, *c*; segment II on the inner surface with a straight row of about 15 small fine teeth forming a comb-like structure, on the outer side near the base of the

claw with 4-5 small teeth; femora of legs with a row of granules inferiorly, those of I not stronger than the others; tarsal segments fairly long and slender, tibia, metatarsus and tarsus of II as in fig. 33, e,

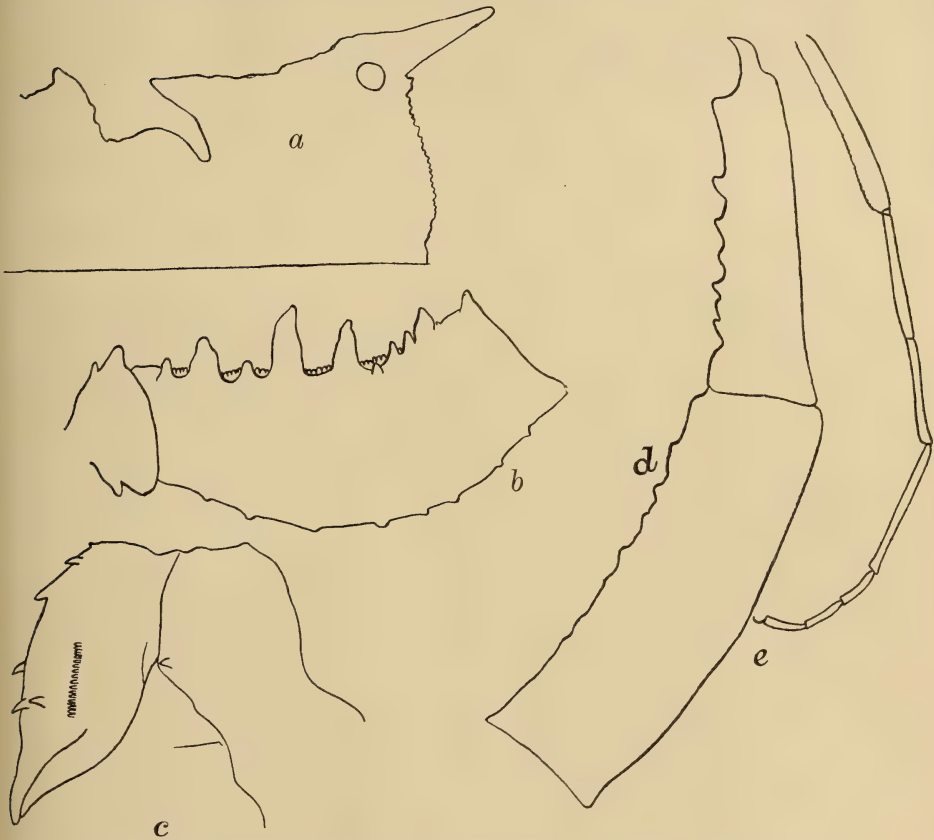


FIG. 33.—*Biacumontia cornuta*. a, ocular tubercle; b, femur of palp from outer side; c, chelicera; d, tibia-tarsus of palp; e, tibia-tarsus of leg II.

the articulation between calcaneus and astragalus well defined; tarsal segments 2:4:3:3.

Measurements.—Total length of body 2·8, pedipalps 4·5 mm.

♀. As in ♂ with the following differences: the posterior process of the ocular tubercle absent, the posterior and superior surfaces of the tubercle meeting at a right angle, anterior spine as in the ♂. Pedipalp: teeth on outer side of femur below much shorter and smaller than in the ♂; tibia and tarsus below with more numerous setae;

chelicera as in ♂, the tooth-like granules of segment II less numerous and smaller, its inner surface with a row of 14–16 comb-like teeth similar to that of ♂. The ♀♀ can be readily distinguished by the pedipalps, which are much shorter in proportion to the body than in the ♂.

Measurements.—Length of body 2·7, pedipalps 2·2 mm.

Types, 3 ♂♂, 1 ♀, Knysna, Cape Province.

Biacumontia truncatidens n. sp.

(Text-fig. 34, *a-g*.)

Colour yellow, legs a little darker.

Carapace and dorsal scute covered with small round granules, anterior margin of carapace without teeth or enlarged granules; ocular tubercle as in figs. 34, *a, b*, seen from the side, with a single terminal process; dorsal scute divided into areas by indistinct grooves, areas with 2 transverse rows of larger seta-tipped granules, those of areas I and II confined to the middle of the segment; area V in anterior half with an irregular row of larger seta-tipped granules, free tergites I and II with 1 row of larger granules in anterior half, some fine granules scattered amongst them, III free tergite with 2 rows of larger granules in anterior half; sternites with a row of round low granules in anterior half, otherwise matt; coxae smooth and shiny except apices of II and III and distal half of IV which are finely granular, coxa I with 2 tubercles along its anterior border.

Pedipalp as in figs. 34, *e, f*; femur with a row of about 11 teeth on outer under-surface, these differing from *cornuta* in being rounded and truncate, not pointed, patella unarmed, tibia as in fig. 34, *d*, with a few round granules distally below, curved, about $1\frac{1}{2}$ times length of tarsus, tarsus with 3 small teeth on each side; chelicera as in fig. 34, *c*, segment I with 2 small teeth at upper apex, the outer side in the middle with 3 strong sharp teeth, segment II on inner side with a straight row of about 17 small comb-like teeth. Legs unarmed; calcaneus of metatarsus I about $\frac{1}{2}$ the length of astragalus, calcaneus of metatarsus II (fig. 34, *g*) about $\frac{1}{3}$ length of astragalus; tarsal segments 2 : 4 : 3 : 3.

Measurements.—Total length 3, pedipalps 5 mm.

Types, 3 ♂♂, Alicedale, Eastern Cape Province. Types in Albany Museum, Grahamstown.

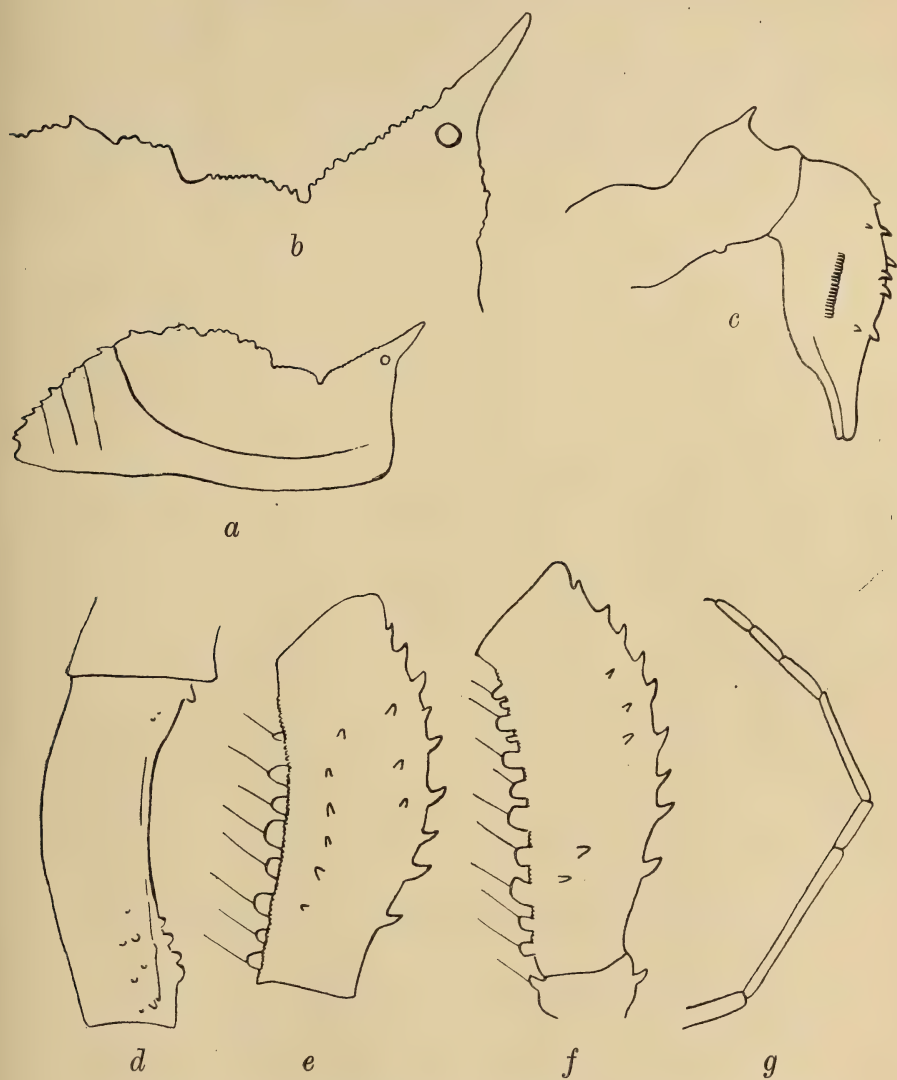


FIG. 34.—*Biacumontia truncatidens*. *a*, body from side; *b*, ocular tubercle; *c*, chelicera; *d*, tibia of palp; *e*, femur of palp from inner; *f*, from outer side; *g*, metatarsus-tarsus of leg II.

Biacumontia fissidens n. sp.

(Text-fig. 35, a-e.)

Colour light olive green, pedipalps light yellow.

Dorsal scute in general armed as in *B. truncatidens*; ocular tubercle as in fig. 35, a, seen from the side, armed with a single terminal

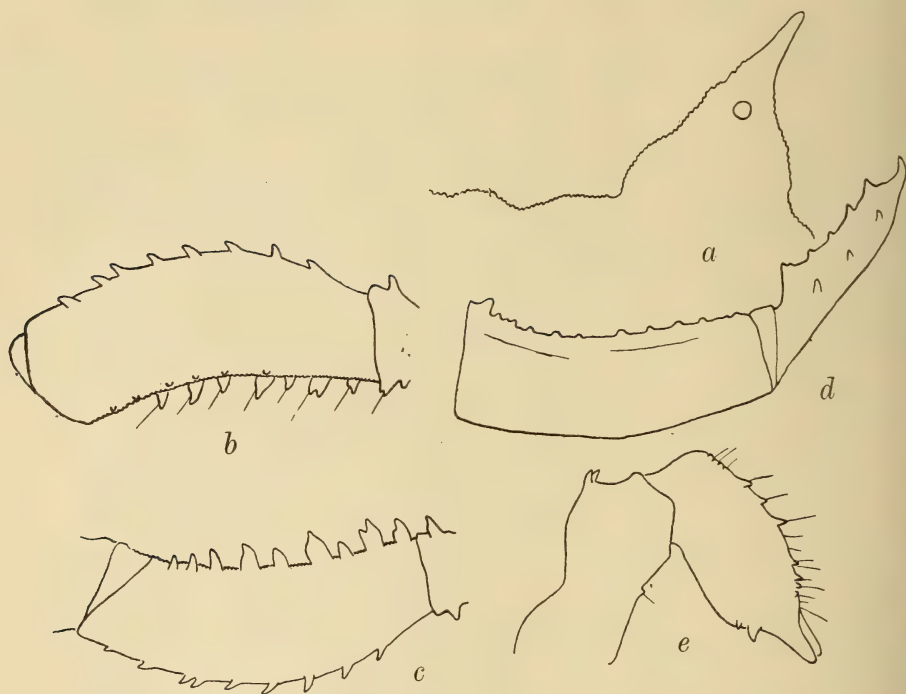


FIG. 35.—*Biacumontia fissidens*. a, ocular tubercle; b, femur of palp from inner; c, from outer side; d, tibia-tarsus of palp; e, chelicera.

process; grooves dividing the areas clearly visible in the middle but not extending to the sides of the scute to meet the lateral grooves, dorsal scute thickly and uniformly covered with small round granules; enlarged granules consisting of a single row of equal-sized seta-tipped granules in each area, those of areas I-III only present in the middle; area V and free tergites I-III all with a single row of larger granules, these segments with a background of small fine granules; sternites with a single row of fairly large round granules only at the sides, those of stigma-bearing sternite larger than those of the remaining sternites,

about 10 in number; coxa IV with a row of 7-8 round granules along its posterior border, coxa III with 4, coxae otherwise as in *B. truncatidens*.

Pedipalp: femur seen from outer side as in fig. 35, *c*, seen from inner side as in fig. 35, *b*, a row of about 9 strong teeth on the outer under side, these teeth pointed or bifid but not rounded or truncate as in *B. truncatidens*; a few low round granules on the inner side, and between these and the outer row of teeth the usual median strip of fine granulation; tibia as in fig. 35, *d*, tarsus as in fig. 35, *d*, the outer side with a triangular tooth at the base and 4 other smaller teeth, inner side with 3 small teeth; chelicera with 2 small teeth at the upper apex of segment I, segment II with a row of 17 minute comb-like teeth on inner side, a large and a small tooth on outer side near the apex (fig. 35, *e*). Legs: metatarsus I with calcaneus about $\frac{1}{2}$ the length of astragalus, metatarsus II with calcaneus about $\frac{1}{3}$ the length of astragalus; tarsal segments 2:4:3:3.

Measurements.—Total length 3, pedipalps 5 mm.

Type, 1 ♂, East London. Type in Albany Museum, Grahamstown.

Gen. AUSTRONUNCIA n. gen.

Dorsal scute without transverse grooves dividing it into areas but with indistinct lateral and posterior grooves, without armature; ocular tubercle low without a terminal spine or process; stigmata on sternite I very clearly visible; pedipalps long and armed with long and strong seta-tipped spines, chelicerae not armed with spines or teeth; legs long and slender, tarsus I consisting of 4, II of 7-10 segments; calcaneus of metatarsi I and II much shorter than astragalus; femur I not armed below; median prong of claws of tarsi III and IV stouter but not longer than the lateral prongs, tarsal segments 4:7-10:4:4; sexual dimorphism strongly pronounced, the pedipalps and chelicerae in the ♂ proportionally much longer than in the ♀ (pedipalps of ♂ almost 3 times the length of body, chelicerae as long as or longer than body).

One species, Western Cape Province.

Austronuncia spinipalpis n. sp.

(Text-fig. 36, *a-f*.)

♂. *Colour*.—Body and appendages olive green, infuscated black; body as in fig. 36, *a*, carapace without granules along anterior margin,

ocular tubercle low, with a few small round granules above; dorsal scute not divided into areas by grooves, indistinct lateral and posterior grooves present; carapace finely shagreened, areas II-IV represented by transverse rows consisting of a few small seta-tipped granules (that of area II consisting of about 4), fifth area and free tergites I and II with a complete row of similar granules, III free tergite with 2 rows; free sternites with an indistinct row of granules, stigma-bearing

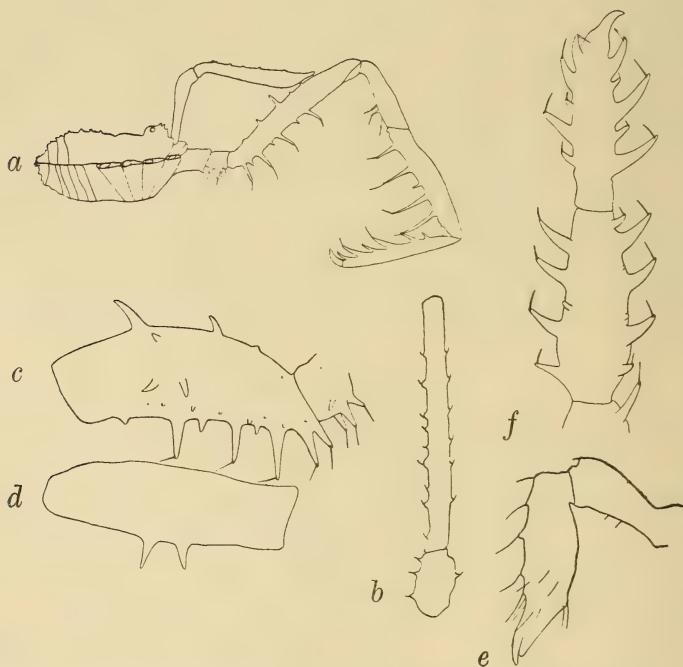


FIG. 36.—*Austronuncia spinipalpis*. ♂: *a*, body, chelicera, and palp from side; *b*, femur of leg I. ♀: *c*, femur of palp from inner side; *d*, from below; *e*, patella-tarsus of palp below; *f*, chelicera.

sternite with stigmatae very distinct; coxae below finely shagreened, not armed except in I, which has 2 irregular rows of conical seta-tipped spines. Pedipalp as in fig. 36, *a*, seen from the outer side; trochanter with 3-4 spines below; femur above with 4-5 teeth, of which only 1 is large, below with 4 large spines tipped with setae on the outer side and some smaller teeth between them, a row of denticles on the inner side below; on the inner surface near the middle 2 moderate teeth; patella with 2-3 inner and 1 outer tooth, the inner apical one the

longest; tibia with 4 long teeth on each side below, tarsus with 3 long alternating with 3 short teeth on each side below; chelicera with a row of small granules on the anterior surface of segment II but no teeth; femur I with some granules below (fig. 36, *b*), but not differentiated from the remaining femora; tarsal segments 4 : 10 : 4 : 4.

Measurements.—Length of body 2·5, chelicerae 3, pedipalps 7 mm.

♀. As in the ♂ but the pedipalps and chelicerae much shorter; armature of body as in ♂; pedipalp as in figs. 36, *c-e*, smooth and shiny without a background of fine granulation; femur below on the outer side with 4-5 large spine-like teeth, a row of 8 small round shiny granules on the inner side, the 2 teeth on the inner surface of femur larger than those of the ♂ (fig. 36, *d*, femur seen in profile from below); trochanter with 4 teeth below; patella, tibia, and tarsus as in fig. 36, *e*, patella with 2 outer, 1 inner teeth, tibia with 5 teeth on inner side, the basal and apical ones much smaller than the rest, outer side with 4 large equal-sized teeth; chelicera as in fig. 36, *f*, unarmed except for a row of 5 granules on the anterior surface of segment II, segment I with matt granulation on the inner side, outer side smooth; legs long and slender, tarsal segments 4 : 7-9 : 4 : 4.

Measurements.—Length of body 2·8, pedipalps 4·2 mm.

Types, 1 ♂, 5 ♀♀, Knysna Forest, Cape Province.

Gen. GRAEMONTIA n. gen.

Ocular tubercle with a single terminal spine; body armed with granules of two kinds, smaller granules swollen at their apices which are bilobed or trilobed and larger cylindrical granules which are considerably longer than wide; dorsal scute not divided by grooves into areas, these represented by distinct rows of granules (fig. 37, *a*); anterior margin of carapace with a row of bilobed granules on each side of the ocular tubercle; stigmatae hidden; coxa I below with 5 long conical seta-tipped spines along its anterior margin; pedipalp strongly armed with numerous long seta-tipped spines; inferior surface of femur without a median strip of fine granulation; calcaneus of all legs much shorter than astragalus; median prong of claws of tarsi III and IV stronger than the lateral prongs, the inner lateral prong much weaker than the outer lateral prong; tarsal segments I, 3; II, 6-8; III, 4; IV, 4; terminal section of I consisting of 2, II of 2 segments.

Two species, Eastern Cape Province.

Key to species.

1. Dorsal scute with a smooth background, chelicerae without teeth (fig. 37, *g*)
bifidens, p. 414.
 Dorsal scute with a background of very fine granules, chelicerae toothed
 (fig. 38, *d*) *denticelis*, p. 415.

Graemontia bifidens n. sp.

(Text-fig. 37, a-h.)

Colour yellow brown with olive green infuscation.

Anterior margin of carapace with a row of about 8 bilobed club-shaped granules on each side of ocular tubercle, these not meeting in

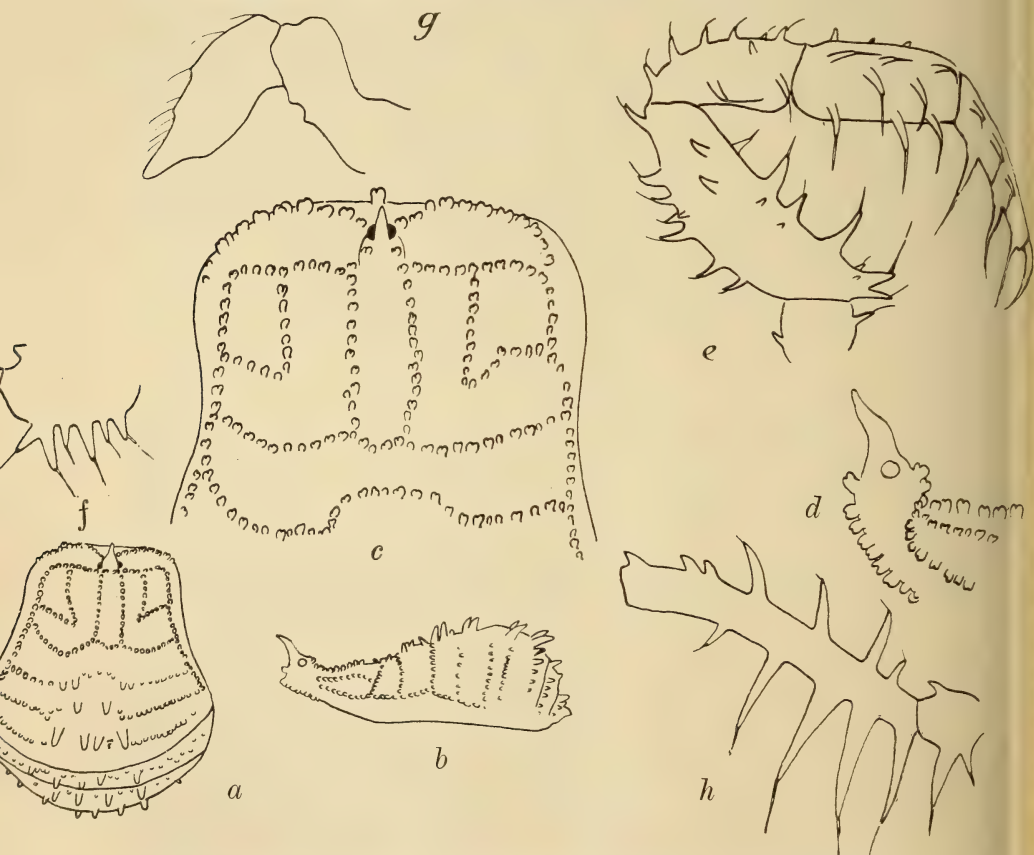


FIG. 37.—*Graemontia bifidens*. a, dorsal surface of body; b, body from side; c, anterior portion of body; d, ocular tubercle; e, palp; f, anterior margin of coxa I; g, chelicera; h, femur of leg I.

the middle line but curving upwards to the base of the ocular tubercle (fig. 37, *c*), a single similar isolated granule in front of ocular tubercle; seen from the side, ocular tubercle with a narrow terminal spine, 2 club-shaped granules on its posterior surface about the level of the eyes (fig. 37, *d*); carapace and dorsal scute with rows of lobed granules similar to those on anterior margin of carapace but a little smaller, arranged as in figs. 37, *a*, *c*; areas represented by transverse rows of lobed granules, areas I–II with 0, III with 2, IV and V with 4 long cylindrical granules in the middle in addition to the lobed granules; free tergites with 8–10 long cylindrical granules, some lobed granules amongst them; sternites matt with a well-spaced row of small round granules; inferior surfaces of coxae matt fairly smooth in the middle, the sutures forming their boundaries filled up with small round granules, anterior margin of coxa I with 5 seta-tipped papilliform granules as in fig. 37, *f*. Pedipalp as in fig. 37, *e*, seen from inner side armed with long slender spines, these tipped with stout setae, femur inferiorly without a strip of fine granulation in the middle; chelicera unarmed as in fig. 37, *g*. Legs: leg I with trochanter and femur armed as in fig. 37, *h*, femur with superior as well as inferior long spines, remaining segments unarmed, femora of remaining legs unarmed; coxa II with a row of 3 granules at its posterior margin near apex, the distal one much larger than the others, coxa IV with 5 granules on its anterior distal margin.

Measurements.—Total length 2·4, pedipalps 2·7 mm.

Types, 2 specimens (sex ?), Stones Hill, Grahamstown. Types in Albany Museum, Grahamstown.

Graemontia denticheles n. sp.

(Text-fig. 38, *a–d*.)

Colour.—Body light yellow with some greenish infuscation, legs olive green, pedipalps light yellow.

Dorsal scute with a background of small fine spicular granulation; anterior margin of carapace with a straight row of about 18 lobed granules not broken in the middle and curving up towards the ocular tubercle, these granules with more distinct lobes than in *bifidens*; ocular tubercle seen from the side as in fig. 38, *a*, with some lobed granules at the sides, 2 lobed granules above the marginal row anteriorly at the base of the ocular tubercle; lobed granules on carapace arranged in rows forming a pattern as in *bifidens* but less regular; large cylindrical granules on areas II–IV and free tergites not differing

so markedly from the smaller lobed granules as in *bifidens*; here, though longer than wide, they are divided into several small lobes at their apices, the sides provided with small granules, almost moruliform; areas with 2-4 larger granules in the middle, area V and free tergites with rows composed mostly of large cylindrical granules with some smaller ones filling the interspaces.

Pedipalp: femur as in fig. 38, *c*, seen from the inner side; chelicera as in fig. 38, *d*, the anterior surface of segment II with 2-3 large

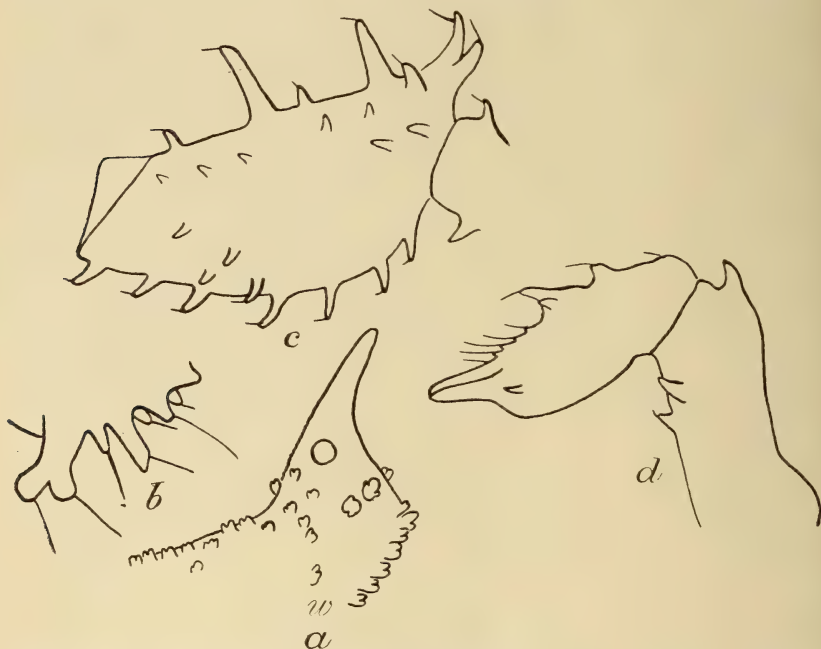


FIG. 38.—*Graemontia denticelis*. *a*, ocular tubercle; *b*, anterior margin of coxa I; *c*, femur of palp; *d*, chelicera.

teeth; femur of leg I armed much as in *bifidens* (fig. 37, *h*), anterior margin of coxa I as in fig. 38, *b*; legs very long and slender, especially II; tarsal segments 3 : 8 : 4 : 4.

Measurements.—Length of body 2.6, pedipalps 3.8; leg II, 11.6 mm.

Type, 1 ♂, Hogsback, Amatola Mountains. Type in Albany Museum, Grahamstown.

Gen. MONOMONTIA n. gen.

Ocular tubercle stout and short, terminal process short; dorsal scute divided into areas by deep clear grooves passing across the scute

to meet the lateral grooves; dorsum comparatively smooth without large or modified granules, areas of dorsal scute with 2 rows of small granules; coxa I below with 2 tubercles along its anterior margin; pedipalps and chelicerae not strongly armed, femur of pedipalp with a row of strong teeth on outer side below, inferior surface with a strip of fine granulation in the middle; stigmatae hidden; femur of leg I armed below, tarsal segments of leg I short and deep; calcaneus of all legs much shorter than astragalus; median prong of claws of tarsi III and IV stronger than the lateral claws; tarsal segments I, 3; II, 3; III, 4; IV, 4.

Two species, Eastern Cape Province.

Key to species.

1. Pedipalp femur on outer side below with 4 teeth, inner surface with 3 teeth (fig. 39, *d*) *atra*, p. 417.
- Pedipalp femur on outer side below with 6 teeth, inner surface with at least 7 teeth (fig. 40, *b*) *rattrayi*, p. 418.

Monomontia atra n. sp.

(Text-fig. 39, *a-f*.)

Colour.—Body and legs blackish with a greenish tinge, carapace a little lighter, pedipalps with blackish reticulate infuscation except patella and tibia above, which are yellow.

Anterior margin of carapace with 2 small granules on each side of the ocular tubercle; ocular tubercle seen from the side (fig. 39, *c*), with 2 sharp granules on its posterior surface; background of dorsal surface of body quite smooth, area posterior to ocular tubercle with a few minute round granules in the middle; areas I–IV with 2 rows of granules, a row of larger conical seta-tipped granules in the middle, and a row of minute round granules along its posterior border (fig. 39, *a*); area V and free tergites with 1 row of larger granules; sternites with 1 anterior row of small granules; coxae smooth and shiny except II and IV which have a small distal patch of fine matt granulation, coxa I with 2 tubercles along its anterior margin, the distal one bifid.

Pedipalp: femur and trochanter seen from the inner side as in fig. 39, *d*, under surface of tibia smooth and slightly concave with 4 blunt seta-tipped teeth on each side below; tarsus with 3 sharp teeth on each side below; chelicera as in fig. 39, *f*, unarmed; leg I armed as in fig. 39, *e*, tarsal segments stouter and more thick-set than

those of remaining legs, remaining legs unarmed; tarsal segments 3:3:4:4.

Measurements.—Length of body 3·5, breadth 3, pedipalps 3 mm.

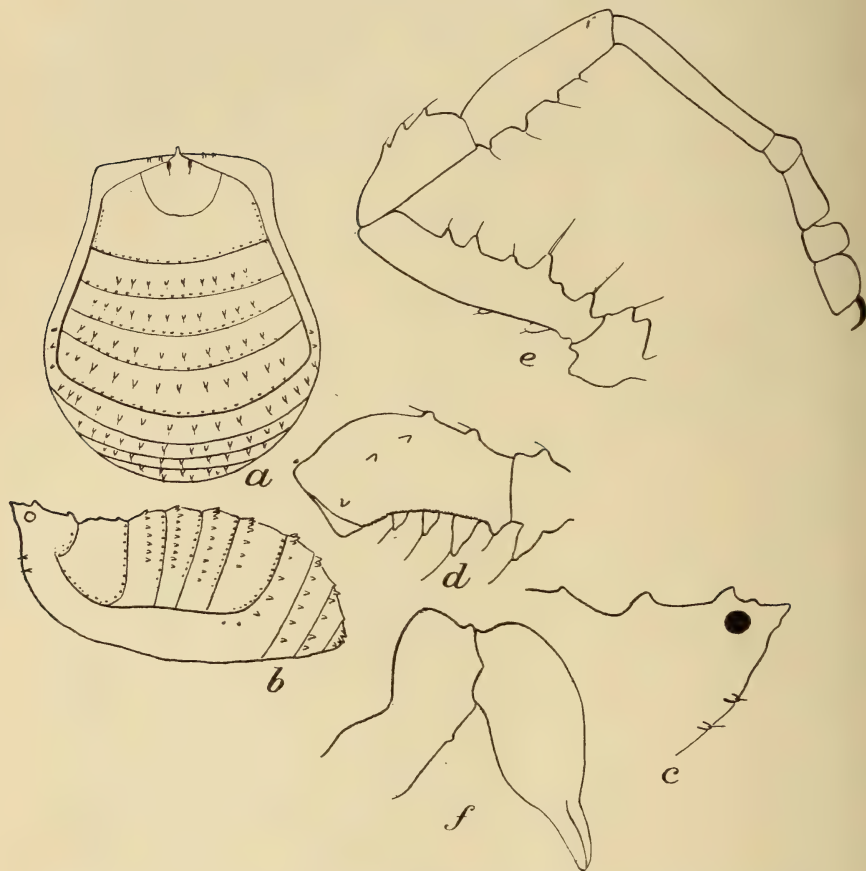


FIG. 39.—*Monomontia atra*. *a*, dorsal surface; *b*, lateral view of body; *c*, ocular tubercle; *d*, femur of palp from inner side; *e*, leg I; *f*, chelicera.

Type, 1 (♀ ?), Hogsback, Amatola Mountains. Type in the Albany Museum, Grahamstown.

Monomontia rattrayi n. sp.

(Text-fig. 40, *a-e*.)

Colour.—Body and legs blackish with a greenish tinge, pedipalps yellow, bases of femur and tibia, apical $\frac{2}{3}$ of tarsus blackish.

Anterior margin of carapace with a few small indistinct granules on each side of ocular tubercle; ocular tubercle seen from the side as in

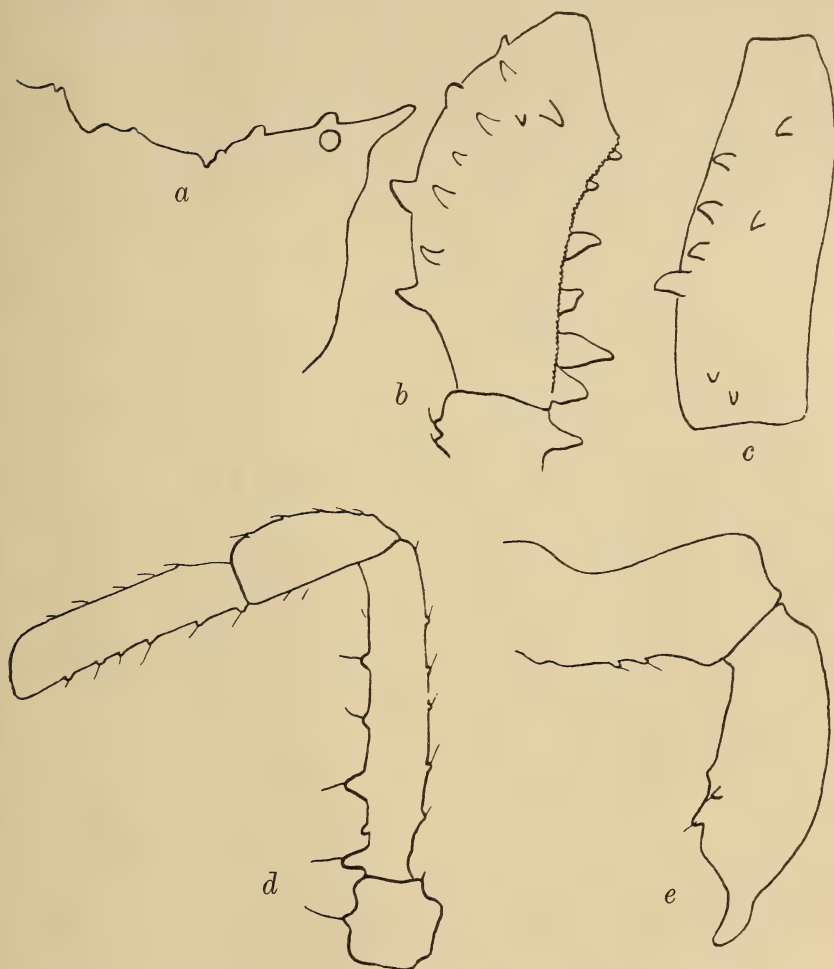


FIG. 40.—*Monomontia ratrayi*. *a*, ocular tubercle; *b*, femur of palp from inner side; *c*, from above; *d*, leg I; *e*, chelicera.

fig. 40, *a*, the terminal process longer and slenderer but otherwise resembling *atra*; segment posterior to ocular tubercle with 2 rows of minute granules along its posterior border, otherwise dorsal scute and free tergites armed as in *atra*; sternites and coxae as in *atra*.

Pedipalp: femur seen from inner side as in fig. 40, *b*, inner surface

of femur near upper side with 5 teeth, 2 lower teeth in the middle near distal apex, inferior outer surface with a row of 6 teeth, the 2 distal ones much smaller than the rest; tibia on outer side with 6, on inner side with 4 granules, none of these large or distinct, inferior surface sparsely granular; chelicera as in fig. 40, *e*; tarsus on outer side near the base with a low bilobed tooth and 4 other minute teeth, inner side with 3 teeth; leg I armed as in fig. 40, *d*; tarsal segments 3 : 3 : 4 : 4.

Measurements.—Length of body 2.9, breadth 2.6, pedipalps 4 mm.

Types, 2 (♂) ?, East London. Types in Albany Museum, Grahamstown.

Gen. ACUMONTIA Loman.

1898. Loman, Zool. Jahrb. Syst., ii, p. 528.

1923. Roewer, Die Weberknechte der Erde, p. 609.

Carapace smaller than scutum; anterior margin of carapace without grooves and its upper surface on each side with or without teeth; ocular tubercle rising directly from the anterior margin of carapace and with I median spine; areas I–IV with a pair of tubercles or spines in the middle; area V and free tergites I–III unarmed or with 1 pair of spines or tubercles in the middle; stigmæ hidden; femur of leg I armed below; calcaneus of metatarsi I–IV much shorter than astragalus; terminal section of tarsus I consisting of 2 segments, that of II of 3 segments; tarsus I with 5 segments, II with more than 6 segments, III and IV with each 4 segments; median prong of claws of tarsi III and IV much stouter than the lateral prong.

One species, Natal.

Acumontia natalensis n. sp.

(Text-fig. 41, *a–e*.)

Colour olive brown, carapace and dorsal scute at the sides with some lighter patches; carapace finely shagreened; anterior margin of carapace without teeth at the sides; dorsal scute finely shagreened, not divided into areas by transverse grooves, the areas represented by transverse rows of granules not reaching the sides, a pair in the middle of each row enlarged and spine-like (fig. 41, *a*), the third pair the largest; fifth area and the free tergites with a transverse row of granules reaching to the sides; ocular tubercle as in fig. 41, *a*, seen from the side; sternites finely shagreened with a row of small granules in the middle; coxae finely shagreened, I with an anterior row of 4 long conical seta-tipped spines, II with a single row of small granules in the middle, III and IV without granules. Pedipalp,

especially tibia and tarsus, armed with long spine-like teeth which are provided at their tips with stout setae, some of which are bent at right angles to the teeth; trochanter with 2 spines below, one of which is

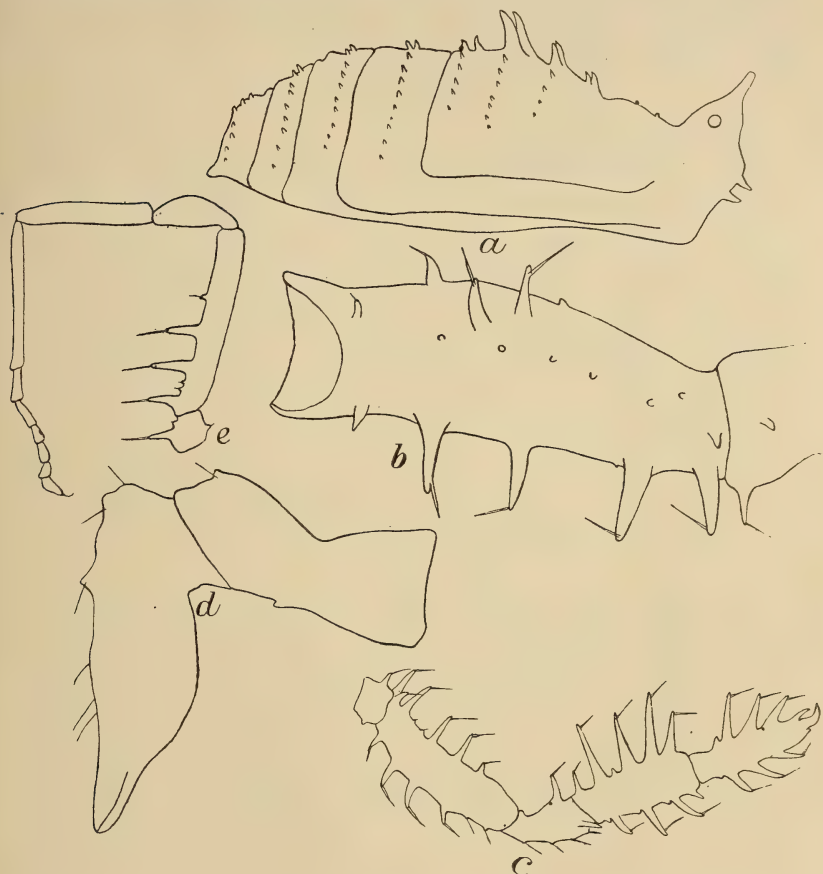


FIG. 41.—*Acumontia natalensis*. *a*, body from side; *b*, femur of palp below; *c*, palp; *d*, chelicera; *e*, leg I.

minute, 1 denticle above; femur as in fig. 41, *c*, seen partly from the side, partly from below, with 4 spines above, and seen from below (fig. 41, *b*), 4 large teeth below along the outer side and a row of about 6 round denticles on the inner side; inner surface with 2 large teeth; patella, tibia, and tarsus strongly armed with long spine-like teeth (fig. 41, *c*); chelicera as in fig. 41, *d*; leg I with femur armed as in fig. 41, *e*; tarsal segments 5 : 10–11 : 4 : 4.

Measurements.—Length of body 4, pedipalps 4·8 mm.

Type, 1 specimen, Pietermaritzburg, Natal.

This species differs from the 5 other species of this genus (all from Madagascar) in the absence of teeth along the upper anterior margin of the carapace.

Gen. SPELEOMONTIA n. gen.

Dorsal scute without grooves dividing it into areas, unarmed except for granules in the middle, ocular tubercle without a spine or process, low, rounded, and sloping backwards from the anterior margin of carapace, eyes far apart; stigmatae visible on stigma-bearing sternite; pedipalps armed with numerous long teeth which are tipped with long setae; chelicerae unarmed; legs slender and long, longer than in other genera of *Trioenonychinae*; tarsus I consisting of 5, II of about 14 segments; median prong of claws of tarsi III and IV shorter than the lateral prongs; calcaneus of metatarsi I and II much shorter than astragalus; tarsal segments 5 : 14 : 4 : 4.

One species, Western Cape Province.

Speleomontia cavernicola n. sp.

(Text-fig. 42, *a-f*.)

Colour light brown, lighter beneath, legs light yellow, eyes surrounded by a pigmented area; dorsum of body covered with a shagreen of fine small granules, the larger granules with a short posteriorly-directed seta; ocular tubercle low, seen from above about its own distance from the anterior edge of carapace (fig. 42, *b*), the eyes set wide apart surrounded by a blackish ring, upper surface of tubercle between the eyes with 1 or 2 granules armed at their tips with a short seta; dorsal scute not divided by grooves into areas, indistinct lateral and posterior grooves present; areas represented by 4 transverse rows of small granules; areas I–III represented at most by about 4 granules, only the row of area IV reaching the sides; free tergites with their posterior margins rimmed and rounded, a row of granules in the middle of each; sternites and coxae finely shagreened, coxa I with about 4 small club-shaped seta-tipped tubercles along its anterior margin; posterior margin of coxa I and anterior margin of coxa III with some small conical granules at their distal apices. Pedipalp seen from the inner side as in fig. 42, *c*; chelicera as in fig. 42, *e*, seen from above segment I, with 2 small brown teeth at distal dorsal apex; segment II with a small rounded tubercle armed with a seta at

its base dorsally; legs long and slender, femur I as in fig. 42, *f*, provided with small round tubercles tipped with setae, not differently armed from the remaining legs; claw of tarsus IV as in fig. 42, *d*, the lateral prongs a little longer and about as stout as the median prong; tarsal segments 5 : 13-15 : 4 : 4; in one specimen the tarsal segments of leg

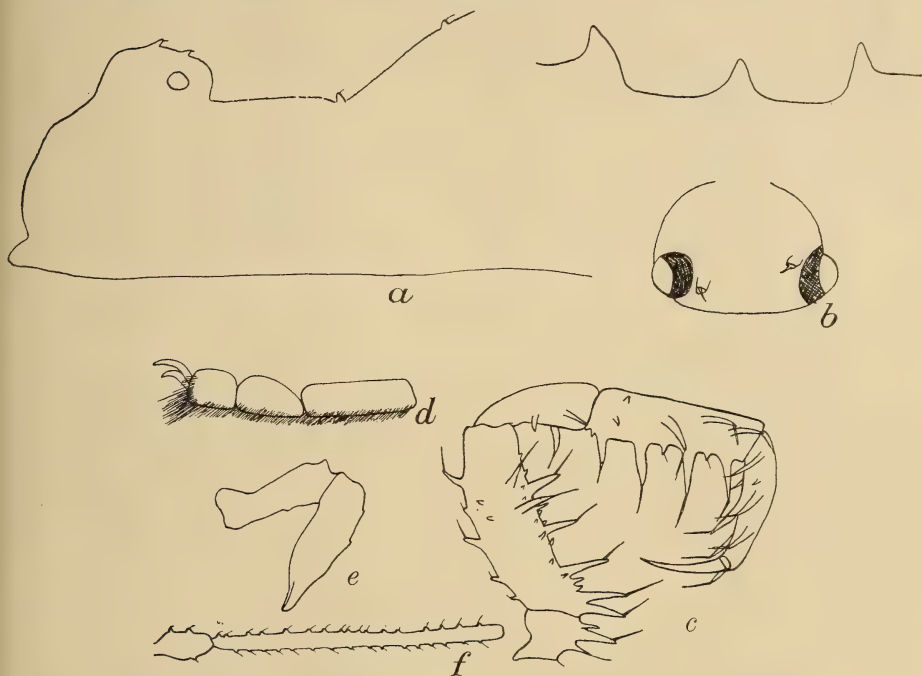


FIG. 42.—*Speleomontia cavernicola*. *a*, ocular tubercle from the side; *b*, from above; *c*, palp; *d*, tarsus IV; *e*, chelicera; *f*, femur of leg I.

I number 4 while in another they number 4 on the one and 5 on the other leg.

Measurements.—Length of body 3, pedipalps 4·7; leg I, 8·4; II, 15·9; III, 10·5; IV, 15 mm.

Types, 6 specimens (4 ♂♂, 2 juvs.) from the Wynberg Caves, Table Mountain, Cape Town. This species has only been found in this locality about 100 feet below the ground surface in complete darkness; some were found under stones, others in damp crevices between the rocks; in the same cave occurs *Speleosiro argasiformis*, a blind Peripatus — *Peripatopsis alba*, and a small Orthopteron — *Speleiacris tabulae*; for a further description of the cave see p. 350.

TABLE OF GENERIC CHARACTERS OF TRIAENONYCHINAE.

Genus.	Stigmae exposed.	Median prong of claws tarsi III-IV > lat. prongs.	Calcaneus much < astragalus	2 tubercles on anterior margin of coxa I.	Dorsal scute divided into areas by grooves.
<i>Ceratomontia</i> (2)	—	+	+	+	+
<i>Mensamontia</i> (3)	—	+	+	—	+
<i>Roeweria</i> (3)	—	—	+	+	—
<i>Amatola</i> (3)	—	+	+	+	—
<i>Rostromontia</i> (3)	—	+	+	except <i>R. lisposoma</i>	+
<i>Cryptobunus</i> (3)	—	+	—	1 tubercle	—
<i>Biacumontia</i> (2)	—	+	—	+	+
<i>Austromontia</i> (3)	—	+	±	+	+
<i>Austronuncia</i> (4)	+	+	+	—	—
<i>Acumontia</i> (5)	—	+	+	—	—
<i>Speleomontia</i> (5)	+	—	+	—	—
<i>Graemontia</i> (3)	—	+	+	—	—
<i>Monomontia</i> (3)	—	+	+	+	+

The numbers in brackets after names of the genera represent the number of segments of the first tarsus.

SUBFAM. **Adaeinae** Pocock.

(Text-fig. 43, *a-e*.)

1903. Fam. *Adaeidae* Pocock, Ann. Nat. Hist., ser. 7, x, p. 513.

1914. *Adaeinae* Roewer, Arch. Naturg., lxxx, A, fasc. 12, p. 141.

1923. „ „ Die Weberknechte der Erde, p. 619.

The subfamily comprises genera containing Triaenonychids of large body size which with the exception of *Micradaeum* varies from 4.5 to 7.6 mm. The shape of the sternum varies far more than in the *Triaenonychinae* but can be separated into two main types: A. (figs. 43, *d, e*). The sternum is triangular and wedge-shaped, widening regularly but gradually towards the base, without a lance-shaped expansion anteriorly or lateral expansions posteriorly; to this division belong *Adaeum*, *Adaeulum*, *Metadaeum*, *Micradaeum*, and *Cryptadaeum*. B. (figs. 43, *a, b*). The sternum is roughly pentagonal in shape and may be slender as in *Larifuga* or broad and stout as in *Montadaeum* and *Paradaeum*. The dorsal scute is always covered

with granules forming definite patterns or irregularly disposed. The stigmæ, with the exception of *Paradaeum*, are hidden under granules bridging the cleft between coxa IV and stigma-bearing sternite.

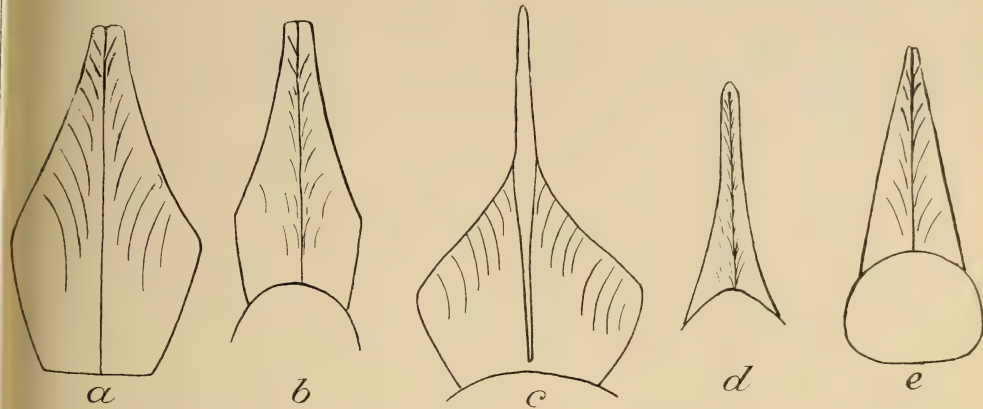


FIG. 43.—*Adaeinae*: a, *Montadaeum*; b, *Larifuga*; c, *Paradaeum*; d, *Adaeulum*; e, *Cryptadaeum*.

Tarsus II is composed, except in *Micradaeum*, of numerous (8-16) segments.

Eight genera in South Africa.

Key to genera.

1. Sternum more or less pentagonal 2.
 Sternum triangular 4.
2. Sternum broadly pentagonal in posterior half, a narrow parallel-sided rod forming its anterior half (fig. 43, c), stigmæ exposed . *Paradaeum*, p. 466.
 Sternum without an anterior rod-like expansion, stigmæ hidden . . . 3.
3. Tarsus I with 4 segments, sternum more than twice as long as broad (fig. 43, b) *Larifuga*, p. 450.
 Tarsus I with 5 segments, sternum less than twice as long as broad (fig. 43, a) *Montadaeum*, p. 464.
4. Tarsus I with 4 segments 5.
 Tarsus I with 3 segments 6.
5. Sternum narrowly triangular (fig. 43, d) . . . *Adaeulum*, p. 426.
 Sternum broadly triangular (fig. 43, e) . . . *Cryptadaeum*, p. 445.
6. Tarsus II with 4 segments *Micradaeum*, p. 448.
 Tarsus II with more than 6 (8-11) segments 7.
7. Terminal section of tarsus II with 3 segments . . . *Adaeum*, p. 435.
 Terminal section of tarsus II with 4 segments . . . *Metadaeum*, p. 444.

Gen. ADAEULUM Roewer.

1923. Roewer, Die Weberknechte der Erde, p. 625.

Sternum slender and triangular; tarsus I with 4 segments, II with more than 6, terminal section of tarsus I consisting of 2 segments, II consisting of 3 or 4 (usually 3) segments; dorsal scute usually divided by longitudinal and transverse strips of granules into smooth lateral and median subquadrate areas (fig. 45, *a*); free tergites usually with cylindrical papilliform granules; stigmatae hidden under granules; genital operculum with seta-tipped papillae; femur of pedipalp armed with strong teeth in the ♂; legs rugose, femur of leg I not armed with long conical papillae below, similar to remaining legs; secondary sexual characters of ♂ present in pedipalps which are larger and armed with longer and stronger teeth than in ♀.

Five species; Natal, Zululand, Eastern Cape Province.

Key to species.

1. Dorsal scute with minute granules not forming transverse rows but uniformly distributed *natalense*, p. 426.
Dorsal scute with minute granules forming transverse and longitudinal rows dividing it into smooth quadrate areas (fig. 45, *a*) 2.
2. Ocular tubercle more or less pointed (fig. 47, *a*) *bicolor*, p. 433.
Ocular tubercle rounded and low (figs. 45, *b*; 46, *a*) 3.
3. Two large teeth on under surface of coxa II near the base in ♂♂ (fig. 46, *b*) *coxidens*, p. 430.
No teeth on under surface of coxa II in ♂♂ 4.
4. Terminal section of tarsus II with 3 segments, no large tooth at inner apex of ♂ pedipalp femur *areolatum*, p. 432.
Terminal section of tarsus II with 4 segments, a very large tooth at inner apex of ♂ pedipalp femur (fig. 45, *e*) *godfreyi*, p. 428.

Adaeulum natalense n. sp.(Text-fig. 44, *a-f*.)

♂. *Colour* light brown; anterior upper margin of carapace with a row of 8-9 stout tooth-like granules, 2 at the antero-lateral angles of carapace, the distal one the larger; dorsal scute resembling *Larifuga* in granulation with uniformly disposed minute granules not forming transverse rows; the 4 areas each with a pair of central conical granules, these equal sized; in addition a pair of conical granules situated behind the ocular tubercle and in front of area I, only a little smaller than those of the 4 areas, and as wide apart as those of area IV; ocular tubercle seen in profile as in fig. 44, *a*, its posterior

slope covered with numerous minute granules and 1 or 2 larger tooth-like ones; posterior margin of dorsal scute with a row of about 8 enlarged conical granules and behind this an irregular row of minute granules; free tergites with an anterior and posterior row of minute granules, a row of enlarged conical granules between them; sternites with an anterior marginal and a middle row of small granules; inferior surfaces of coxae I and II covered with granules, those of I more

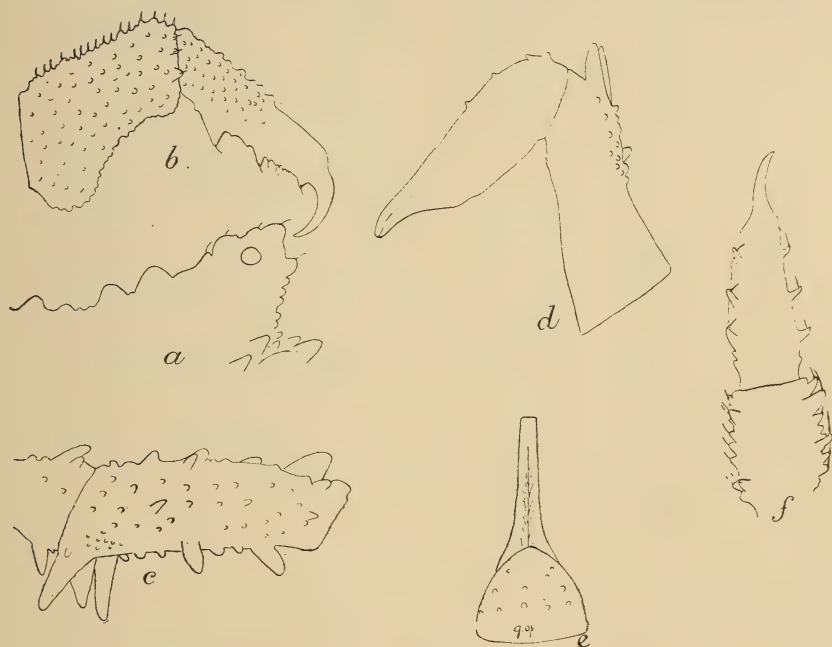


FIG. 44.—*Adaeulum natalense*. ♂: *a*, ocular tubercle; *b*, tibia-tarsus of palp; *c*, femur of palp, outer side; *d*, chelicera; *e*, sternum (*g.op.*, genital operculum); *f*, tibia-tarsus of palp of ♀.

conical, 2 at the distal anterior margin larger than the rest, III sparsely covered with granules, IV with only a few scattered granules; the granules filling up the cleft between coxa IV and stigma-bearing sternite few in number; posterior distal margin of coxa II with 3-4 long conical seta-tipped granules; sternum as in fig. 44, *e*, widening near the base, not tapering regularly as in *A. coxidens* nor roughly pentagonal as in *Larifuga*, compare fig. 42, *b*; pedipalp, seen from outer side as in fig. 44, *c*; trochanter with 2 teeth above, 1 below; femur above on outer side with a row of 3 stout teeth, the apical one larger than the rest, below with 3 stout basal teeth and 2 much smaller

outer teeth, 2 stout contiguous teeth on inner side at apex ; whole of femur strongly rugose except on inner side ; patella unarmed, tibia seen in profile (fig. 44 *b*), with a peculiar swelling at its base inferiorly, without teeth but the whole segment strongly granular, tarsus with 3 teeth on each side, granular except distally ; chelicera as in fig. 44, *d* ; segment I rugose above with 2 fairly large teeth at its distal apex, shagreened at the sides ; segment II shiny with a few small tooth-like granules on its anterior surface ; femur of leg I not armed with spines below, similar to the femora of remaining legs, covered with fine granules ; tarsal segments 4 : 17-18 : 4 : 4.

Measurements.—Length of body 5·9, breadth 4, pedipalps 4·5 mm.

♀. As in ♂, the granulation of body similar except that the tooth-like granules on anterior upper margin of carapace are smaller ; all coxae equally and thickly granular ; pedipalp much smaller than in ♂ ; trochanter with 1 tooth below, 2 small teeth above ; femur with 2 basal teeth (smaller than in ♂), 2 small teeth on outer side, 3-4 moderate intero-dorsal teeth ; patella with 2 spines on inner side, tibia and tarsus as in fig. 44, *f*, tibia not swollen inferiorly as in ♂ ; chelicera as in ♂, the 2 teeth at distal dorsal apex of segment I smaller ; tarsal segments 4 : 14-18 : 4 : 4.

Measurements.—Length of body 7, breadth 4·5, pedipalps 3·8 mm.

Types, 3 ♂♂, 9 ♀♀, Pietermaritzburg, Natal. This species represents a form intermediate between *Larifuga* and *Adaeulum*.

Adaeulum godfreyi n. sp.

(Text-fig. 45, *a-g*.)

♂. *Colour* olive green or earthy brown from the coating of fine particles of sand and earth adhering to and partly filling up the interspaces of the granules.

Dorsum with granulation as in fig. 45, *a*, seen from above ; divided by transverse strips and a double longitudinal median strip of granules into 6 smooth subquadrate areas on each side, the last one incomplete, II to VI representing the 5 areas ; seen from the side, the longitudinal rows in each area form small tumuli of undifferentiated granules (fig. 45, *b*) ; anterior margin of carapace with a group of close-set cylindrical granules forming a cone-shaped projection in front of ocular tubercle ; ocular tubercle unarmed but granular, especially posteriorly ; posterior border of dorsal scute and free tergites with an anterior irregular row of small granules and a posterior more regular row composed of 8-12 long cylindrical granules with

slightly swollen apices tipped with short setae; these long cylindrical granules well separated, the interspaces filled up with smaller cylindrical granules (fig. 45, *c*); sternites with small granules in anterior half,

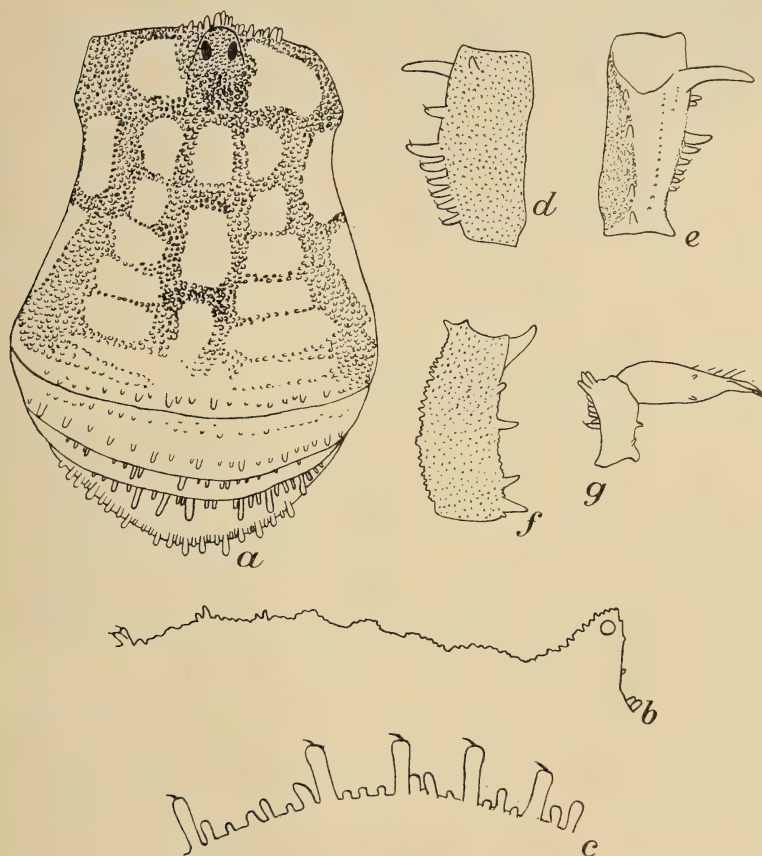


FIG. 45.—*Adaeulum godfreyi*. *a*, dorsal surface of body; *b*, ocular tubercle; *c*, profile of free tergite II; *d*, femur of palp above; *e*, below; *f*, from outer side; *g*, chelicera.

smooth in posterior half; coxae thickly granular except IV which is more or less smooth in the middle, the granules at the bases of all coxae and those along the anterior margin of coxa I enlarged and conical; stigma-bearing sternite thickly covered with granules, the cleft between it and coxa IV filled up with granules; genital operculum with about 12 small seta-tipped papillae.

Pedipalp: femur seen from above as in fig. 45, *d*; a row of 6 teeth

on the inner upper side, the distal one largest, the rest decreasing in size proximally; seen from below (fig. 45, *e*), the inner and under surface of femur between these teeth and the 4 teeth on under outer surface (fig. 45, *f*, seen from the outer side) smooth, except for a longitudinal row of small granules in the middle; remainder of femur rugose, covered with small granules; apex of femur at inferior inner angle with a long curved tooth (the convexity of the curve directed downwards), this tooth much larger than any others of the pedipalp, its axis at right angles to the axis of the femur and pointing directly inwards, its length subequal to that of patella; patella and tibia rugose, without teeth, tarsus smooth and shiny except proximal $\frac{2}{3}$ above which is rugose, 3 teeth on inner, 0 on outer side. Chelicera as in fig. 45, *g*; segment I at upper apex with 2-3 teeth, the middle one the largest. Legs strongly rugose, femur I not specially armed but with a few granules below; terminal section of tarsus II consisting of 4 segments; tarsal segments 4: 13-15: 4: 4.

Measurements.—Length of body 6·7, breadth 5·8, pedipalps 5·8 mm.

♀. Arrangement of granules on dorsum of body similar to that of ♂; pedipalp much shorter and smaller than in the ♂, the interosuperior teeth of femur smaller, the large tooth at interosuperior apex of femur replaced by 2 smaller teeth; the row of granules in the middle of the inferior surface of femur represented by larger tooth-like and conical granules, these about 7 in number; 1 small tooth-like granule at upper apex of segment I of chelicera; terminal section of tarsus II consisting of 4 segments; tarsal segments 4: 12-13: 4: 4.

Measurements.—Length of body 6·3, breadth 4·2, pedipalps 3·3 mm.

Types, 1 ♀, 1 ♂, Pirie, Eastern Cape Province. Collected by the Rev. R. Godfrey. The species belongs to the *coxidens* and *bicolor* group in having an enlarged tooth on femur of pedipalp; it differs from the former in having no enlarged teeth on inferior surface of coxa II, from the latter in the enlarged tooth of pedipalp femur springing from the apex and not the middle of the femur, etc.

Adaeulum coxidens n. sp.

(Text-fig. 46, *a-g*.)

♂. *Colour* brown, metatarsi and tarsi of legs, under surface of pedipalps distinctly lighter; dorsal scute with a double median row of tubercles composed not of one enlarged granule but of a cluster of small granules forming a low tumulus (fig. 46, *a*); transverse rows of minute granules dividing dorsal scute into the usual 4 areas, these

granules forming aggregations at the sides; a fifth pair of ill-defined areas behind the ocular tubercle, another area on each side of the ocular tubercle, all these areas smooth and shiny; posterior margin of dorsal scute and free tergites I and II with a transverse row of cylindrical papilliform granules with slightly swollen tips, free tergite III with triangular granules; ocular tubercle rounded as in fig. 46, a;

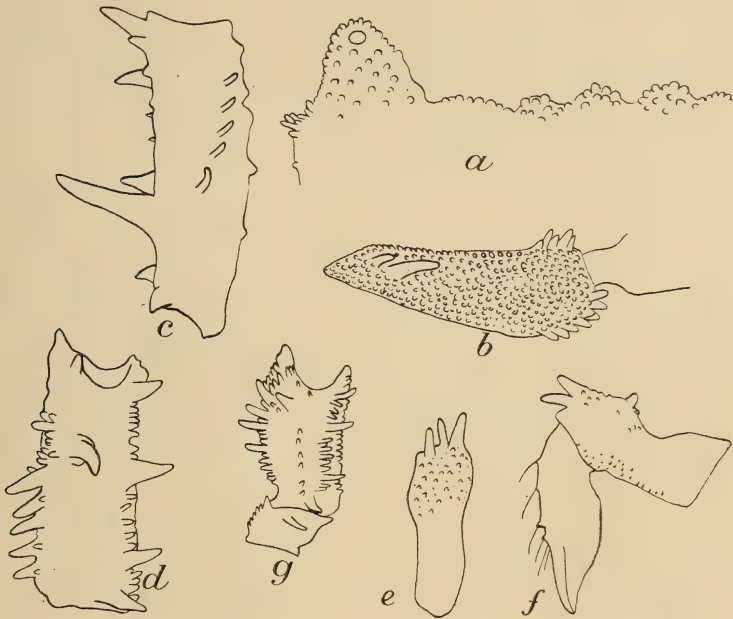


FIG. 46.—*Adaeulum coxidentis*. ♂: a, ocular tubercle; b, coxa II; c, femur of palp from inner side; d, from below; e, segment I of chelicera from above; f, from side. ♀: g, femur of palp below.

sternites irregularly granular anteriorly; inferior surfaces of coxae, genital operculum, and the cleft between coxa IV and stigma-bearing sternite thickly and evenly granular, coxa I with a row of conical granules along its anterior margin larger than the others; inferior surface of coxa II with 2 stout teeth arising from the granules near its base, slightly curved, pointing upwards and outwards, the distal one considerably larger than the proximal one (fig. 46, b); these teeth are not present in any other species of *Adaeinid* I have examined, and they occur in both the males though not the females; genital operculum with 5 papillae tipped with setae. Pedipalp: trochanter seen from below with 3 teeth, the middle largest, the inner one

minute; femur seen from below (fig. 46, *d*), with 4 enlarged teeth on the outer side and between them some small tooth-like granules; on the inner side an oblique row of 6-7 teeth, the fifth from the base large, the 2 distal ones small (fig. 46, *e*); ventrally a very large tooth arising just anterior to the middle of the femur and pointing downwards and a little inwards, at the inner side apically a blunt tubercle; patella unarmed, tibia and tarsus with some inconspicuous teeth on each side. Chelicera: segment I seen from above with a rugose patch in apical half ending distally in 3 blunt teeth (fig. 46, *e*); segment II seen from the side (fig. 46, *f*), with a row of denticles in front; femur of leg I not armed, similar to remaining legs, with 4 dorsal seta-tipped granules in basal half; tarsal segments 4: 12-13: 4: 4.

Measurements.—Length of body 6·7, breadth 4·3, pedipalps 7 mm.

♀. Armature of body as in ♂, the granules and papillae smaller; femur of pedipalp as in fig. 46, *g*, seen from below, trochanter with 2 spines below, patella with 2 spines on inner side, tibia with about 4, tarsus with 3 spines on each side; chelicera as in ♂ except that there are 2 teeth at the distal apex above; legs as in ♂; coxa II without 2 teeth near the base; tarsal segments 4: 13-14: 4: 4.

Measurements.—Length of body 7·3, breadth 4·3, pedipalps 5 mm.

This species is related to *A. areolatum* from Grahamstown.

Types, 2 ♂♂, 2 ♀♀, Amatola Mountains, Eastern Cape Province.

Adaeulum areolatum Pocock.

The following is Pocock's description, Proc. Zool. Soc., 1902, pt. 2, p. 401:—

“♂. *Colour* yellowish brown, generally obscured by the mud or mould adhering to the granules. Dorsal scute with anterior border convexly rounded and thickly beset with cylindrical papillae; ocular tubercle thickly granular, convexly rounded on the summit; behind the tubercle are two parallel rows of tubercles extending to the posterior border of the scute and forming segmental excrescences; midway between these and the lateral border is another irregular band of granules extending from the antero-lateral angle; there are also narrow transverse rows of granules extending across the scute from side to side and passing between the submedian granular excrescences; the interspaces between and defined by the bands of granules form subquadrate smooth depressed areas. The posterior border of the scute and of the three following tergites with a row of papilliform tubercles; the rest of the tergal plates thickly granular. Sterna

granular anteriorly. Coxae thickly granularly papillate. Genital sternum with seven long hair-tipped papillae. Sternum of cephalothorax, the adjacent area of the 3rd coxa, and the maxillary process of the 2nd coxa forming a smooth and shining depression flanked on each side by papillae arising from the coxae.

“Mandibles with the basal segment granularly tubercular above, with one or two longer papillae distally; second also with some sharp tubercles in front. Palpi thicker than the legs, thickly granular; the femur at the base on the inner side with four strong spines and one more distal, and beneath with one smaller and three strong spines, and one strong spine on the inner side inferiorly; tibia, patella, and tarsus subequal in length; the tibia without distinct and large paired spines beneath; tarsus with three pairs of longer spines in addition to the tubercles; claw short.

“Legs tubercular and granular, unspined, even the femur of the 1st hardly spined below; some longish cylindrical papillae on the outer side of the 2nd and 4th coxae; tarsal segments 4:11:4:4.

“♀. Differs from ♂ in that the papillae on the anterior border of the carapace are shorter and form a median angular projection; the spines on the base of the inner side of the femur of the palp are much smaller and the tibia is armed internally with longer hair-tipped papillae.

“*Measurements* in mm.: (♂) Total length 7·5; palpus 5; 1st leg 8, 2nd 13, 3rd 9, 4th 12.

“Loc. Grahamstown in S. Africa (Dr. Schonland).”

The Museum has 1 ♂ from Doornek, Alexandria Division, Eastern Cape Province. The Albany Museum, Grahamstown, has specimens from East London, Cathcart, Coldsprings, Port Alfred, Somerville, Grahamstown.

Adaeulum bicolor n. sp.

(Text-fig. 47, a-g.)

♂. *Colour* of body above brown, metatarsi of legs light brown, tarsal segments yellow, body below chocolate brown, a crescentic patch on the last sternite and anterior border of anal plate yellow; coxa I below yellow, a triangular spot near its distal apex brown, remaining coxae brown, the inner edges bordering the sternum yellow; pedipalps with the rugose areas brown, the smooth portions yellow; femur, patella, and tibia above and at the sides chocolate brown, sharply demarcated from the yellow ventral surface, tarsus brown in basal half above, the rest yellow; chelicerae with a brown spot above in segment I, the rest yellow. Anterior upper margin of carapace

with a close-set comb-like row of papillae; ocular tubercle seen in profile as in fig. 47, *a*; dorsum of body with papilliform granules of which the enlarged ones are cylindrical and longer than wide, the crevices between the granules filled up with sand and grit giving the body a brown and rugose appearance; dorsal scute with 2 central rows of tubercles each containing a group of cylindrical papillae

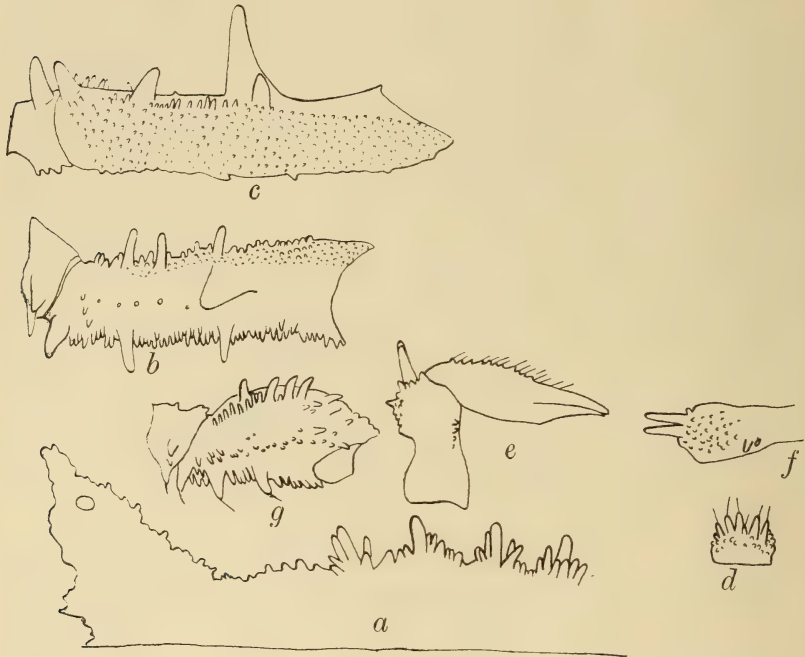


FIG. 47.—*Adaeulum bicolor*. ♂: *a*, ocular tubercle; *b*, femur of palp from below; *c*, from outer side; *d*, genital operculum; *e*, chelicera; *f*, segment I of chelicera from above. ♀: *g*, femur of palp below.

springing from shorter papillae and granules; transverse rows of single granules dividing dorsal scute into 4 smooth shiny areas and meeting a wide lateral row of granules on each side, in addition smooth areas behind and at the sides of the ocular tubercle; posterior margin of dorsal scute and free tergites with a row of cylindrical papillae rising from more or less irregularly placed much smaller granules; anterior sternites granular in anterior half, smooth in posterior half, last two sternites granular throughout; coxae strongly rugose, coxa I and the portions of remaining coxae bordering on the sternum with conical seta-tipped granules; genital operculum as in fig. 47, *d*, armed

anteriorly with 6 cylindrical papillae tipped with setae. Pedipalp strongly rugose above and at the sides, smooth and shiny below; trochanter with 2 stout teeth below; femur seen from below (fig. 47, *b*) with 1 very large tooth arising at about the middle from the smooth area and directed slightly inwards (seen from outer side, fig. 47, *c*), proximally to this tooth a row of 5–6 minute granules in the middle; outer side with a row of 3 moderate teeth in proximal half, inner side with 3–4 small teeth, dorsally 2–3 indistinct larger granules; patella unarmed, tibia unarmed except for 1–2 small teeth apically on the inner side, tarsus with a stout triangular tooth at its inner base and 1 or 2 small teeth distal to it; chelicera seen from above with 2 long teeth at the apex of segment I (fig. 47, *f*), behind these a roughly granular area, seen from the side (fig. 47, *e*), segment II with a row of pointed granules on its anterior surface; legs all rugose except tarsi and metatarsi, femur I not armed with spines below but with 6 tooth-like granules above and 1–2 very small seta-tipped papillae in proximal half below; tarsal segments 4 : 10 : 4 : 4.

Measurements.—Length of body 6·3, breadth 4, pedipalps 8·2 mm.

♀. *Colour* as in ♂, tarsus of pedipalp yellow throughout; armature of dorsum of body as in ♂ except that the papilliform granules are not as large and conspicuous. Pedipalp: trochanter with 2 teeth below and a small one between them, femur below as in fig. 47, *g*; tibia granular below with about 4 enlarged granules on each side, tarsus with 3 triangular teeth on each side below. Chelicera: segment I without enlarged teeth at dorsal apex but provided above in apical half with a dense patch of papilliform granules, the anterior ones projecting forwards beyond the anterior edge of the segment, segment II as in ♂; legs as in ♂; tarsal segments 4 : 8–9 : 4 : 4.

Measurements.—Length of body 5, breadth 4, pedipalps 4·8 mm.

Types, 4 ♂♂, 3 ♀♀, Mfongosi, Zululand. Other localities: 1 ♂, Inchanga, Natal.

Gen. ADAEUM Karsch.

1880. Karsch, Zeit. Naturw., liii, p. 403.

1923. Roewer, Die Weberknechte der Erde, p. 620.

Sternum narrowly triangular (fig. 50, *b*); tarsus I with 3 segments, II with more than 6, III and IV with 4 each; terminal section of tarsus I consisting of 2 segments, II consisting of 3 segments; secondary sexual characters of ♂ present in pedipalp which is larger and more strongly armed than in ♀.

Seven species, Cape Province.

Key to species.

1. Dorsal scute divided by transverse and longitudinal rows of granules into smooth lateral areas (figs. 49, *a*; 50, *a*) 2.
Dorsal scute densely and uniformly granular, sometimes with median but with no lateral areas (figs. 52, *a*; 53, *a*) 4.
2. Patella of pedipalp without teeth *asperatum*, p. 436.
Patella of pedipalp with teeth 3.
3. Anterior margin of carapace with an irregular row of small more or less equal-sized teeth (fig. 49, *a*) *obtectum*, p. 437.
Anterior margin of carapace with larger but fewer teeth, a group of 3-5 closely contiguous teeth in front of ocular tubercle, the middle one outstanding (fig. 50, *a*) *latens*, p. 438.
4. Dorsal scute uniformly granular throughout, without smooth areas (fig. 53, *a*) 5.
Dorsal scute with 4-5 smooth median areas, anterior margin of carapace with a group of 3-5 closely contiguous teeth in front of ocular tubercle, the middle one outstanding (fig. 52, *a*) 6.
5. Anterior margin of carapace beset with teeth of which the middle one is outstanding *heuwitti*, p. 506.
Anterior margin of carapace beset with small equal sized teeth (fig. 53, *a*) *squamatum*, p. 442.
6. Claws of chelicerae modified (fig. 52, *f*), patella of pedipalp with 2 normal teeth on inner side (fig. 52, *e*) *granulosum*, p. 441.
Claws of chelicerae normal (fig. 51, *e*), patella of pedipalp with 1 large crescentic tooth on inner side (figs. 51, *c*, *d*) *spatulatum*, p. 439.

Adaeum asperatum Karsch.

(Text-fig. 48, *a-b*.)

1880. Karsch, Zeit. Naturw., liii, p. 403.

1923. Roewer, Die Weberknechte der Erde, p. 620, fig. 779, *a-b*.

Anterior margin of carapace without a transverse groove, above with 3 small teeth in the middle, otherwise rugose granular; ocular tubercle sloping forwards, unarmed, rising directly from the anterior margin of the carapace, rugose granular; carapace on each side of ocular tubercle rugose granular; dorsal scute with 4 areas divided on each side of the central pairs of tubercles into quadrate fields by rows of small granules; area V and I-III free tergites each with 1 transverse row of enlarged and widely spaced granules; genital operculum rugose granular, bordered anteriorly and at the sides with 8 slender papillae; inferior surfaces of coxae I-IV densely and coarsely granular, a little smoother in the middle; coxa I with 3 teeth along its anterior margin, coxa II with 4 along its posterior distal margin.

coxa IV with 4 along its lateral distal margin. Chelicerae : segment I smooth, segment II rugose granular anteriorly ; pedipalps from inner and outer side as in figs. 48, *a*, *b* ; legs stout, trochanters I–IV granular, I with 1 ventral tooth in addition ; femora I and II with 4 small ventral spines ; calcaneus of legs I–IV apically swollen and short ;



FIG. 48.—*Adaeum asperatum*. *a*, palp from inner side ; *b*, palp from outer side (copied from Roewer).

tarsal segments 3 : 10 : 4 : 4. Colour of body a dirty reddish brown, appendages a little lighter.

Measurements.—Length of body 6, pedipalps 6, legs 6·5 : 9 : 7 : 9.

South Africa, locality according to Pocock probably Port Elizabeth.

Type, 1 (♂ ?), in Berlin Museum. The figure given by Roewer represents in all probability a ♀.

Adaeum obtectum Loman.

(Text-fig. 49, *a–e*.)

1898. Loman, Zool. Jahrb. Syst., ii, p. 525, t. 31, figs. 14–17.

1923. Roewer, Die Weberknechte der Erde, p. 621, fig. 780, *a–e*.

Body in appearance and armature of ocular tubercle, chelicerae, apices of coxae I–IV, and trochanters I–IV as in fig. 49, *a* ; all free sternites and inferior surfaces of coxae I–IV with rugose and dense irregular granulation ; coxa I with 1 anterior row of tubercles ; genital operculum as in fig. 49, *e* ; pedipalp seen from outer and inner sides as in figs. 49, *c*, *d* ; legs stout, trochanter to metatarsus of I–IV with rugose and close granulation ; calcaneus of legs I–IV short and apically swollen ; tarsal segments 3 : 8–10 : 4 : 4. Colour of body and all appendages light reddish brown, the tubercles of scute and tergites I–IV lighter.

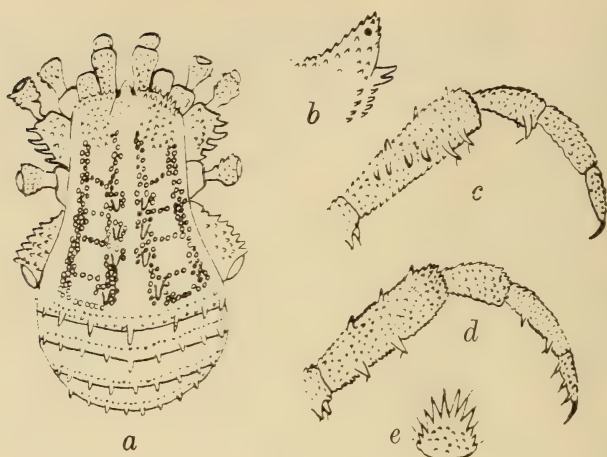


FIG. 49.—*Adaeum obtectum*. *a*, dorsal surface of body; *b*, ocular tubercle; *c*, palp from inner; *d*, from outer side; *e*, genital operculum (copied from Roewer).

Measurements.—Length of body 6·5, pedipalps 4, legs 7 : 11 : 8 : 12. Types, 2 (♂ or ♀?), Knysna. Types in Amsterdam Museum. The figure given by Roewer represents in all probability a ♂.

Adaeum latens Loman.

(Text-fig. 50, *a-f*.)

1898. Loman, Zool. Jahrb. Syst., ii, p. 526, t. 31, fig. 11.

1923. Roewer, Die Weberknechte der Erde, p. 621, fig. 781, *a-f*.

Body in appearance and armature of ocular tubercle, chelicerae, apices of coxae I–IV, and trochanters I–IV as in fig. 50, *a*; all free sternites more or less irregularly and coarsely granular; genital operculum as in fig. 50, *d*; inferior surfaces of coxae I–IV with close and irregular coarse granulation, sometimes more sparsely granular in the middle; coxa I with 1 anterior row of 4–5 tubercles; pedipalp seen from inner and outer sides as in figs. 50, *e, f*; legs stout, trochanter to metatarsus of I–IV with close rugose granulation; trochanter I with 1 ventral tooth; femora I and II with each 4 ventral spines; calcaneus of legs I–IV apically swollen; tarsal segments 3 : 8–9 : 4 : 4. Colour of body dorsally darker and ventrally lighter reddish brown; appendages light reddish yellow.

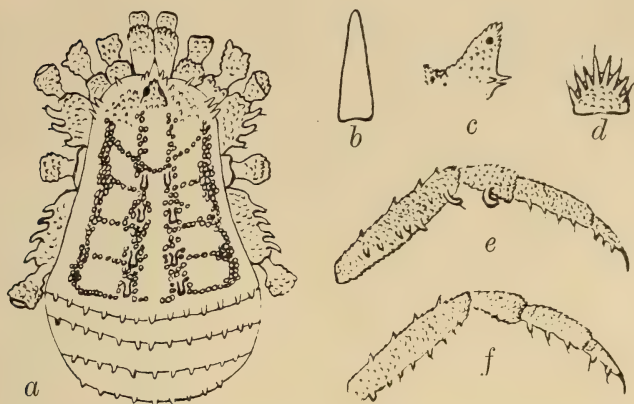


FIG. 50.—*Adaeum latens*. *a*, dorsal surface of body; *b*, sternum; *c*, ocular tubercle; *d*, genital operculum; *e*, palp from inner; *f*, palp from outer side (copied from Roewer).

Measurements.—Length of body 4·5, pedipalps 4·5, legs 6 : 9 : 7 : 10.

Types, 2 (♂ or ♀ ?), Knysna. Types in Amsterdam Museum.

The figure given by Roewer represents in all probability a ♂.

Adaeum spatulatum n. sp.

(Text-fig. 51, *a-f*.)

♂. *Colour* light yellow brown.

Carapace with anterior margin armed as in fig. 51, *b*, seen from above, anterior lateral angles of carapace with 3 large teeth; dorsal scute and free tergites with granules arranged as in *granulosum* (cp. fig. 52, *a*); ocular tubercle seen from the side as in fig. 51, *a*, its apex with some large round granules; median granules of areas of dorsal scute larger than in *granulosum*, those behind the ocular tubercle forming 2 parallel rows, transverse rows of granules larger and more distinct than in *granulosum*; area V with a row of large conical granules, the interspaces with small round granules; free tergites in anterior half with a transverse row of large conical granules and some much smaller ones, posterior half matt; sternites with an anterior row of small bead-like granules doubled at the sides, remainder of sternite smooth; cleft between coxa IV and stigma-bearing sternite filled up with numerous round granules; whole of inferior surfaces of coxae except III and IV in the middle covered with granules, coxa I with some larger conical granules along its anterior margin, these increasing in size distally;

genital operculum covered with small round granules, its anterior margin with 9 long seta-tipped papillae.

Pedipalp coarsely granular except on under surfaces of segments; femur seen from outer side as in fig. 51, *c*, from inner side as in fig. 51, *d*; patella with a conspicuous crescentic blade-like tooth on inner side below, femur near inner apex with a similar but smaller tooth; tibia with 2 moderate teeth on inner side near apex and some smaller ones, tarsus with 3 teeth on each side; chelicera seen from outer side as in



FIG. 51.—*Adaeum spatulatum*. ♂: *a*, body from the side; *b*, anterior part of body from above; *c*, palp; *d*, femur of palp from inner side; *e*, chelicera. ♀: *f*, femur-patella of palp from inner side.

fig. 51, *e*, the fingers of the claw normal, not armed as in *granulosum*; legs unarmed, femur I below near the base with a few granules; tarsal segments 3: 9: 4: 4.

Measurements.—Length of body 5, breadth 3·4, pedipalps 3·4 mm.

♀. Granulation of dorsum as in ♂, anterior margin of sternites with a closely contiguous row of small round granules, a well-separated row of minute seta-tipped granules in the middle, posterior to this smooth; genital operculum with 7 papillae along its anterior margin; pedipalp much smaller than in ♂, as in fig. 51, *f*, seen from the inner side, patella without a crescent-shaped tooth but with 2 smaller teeth on inner side; otherwise as in ♂; tarsal segments 3: 8: 4: 4; tarsus II sometimes with 9, occasionally with 7 segments.

Measurements.—Length of body 5, breadth 3·7, pedipalps 3·6 mm.

Types, I ♂, 9 ♀♀, George. The ♂ of this species closely resembles that

of *A. latens* Loman, from Knysna, in the armature of the pedipalp; if, however, the figure given by Roewer in *Die Weberknechte der Erde* is correct, the granulation of the dorsal scute in *A. spatulatum* is quite different, there being no trace of smooth lateral quadrate areas (cp. text-fig. 50, a).

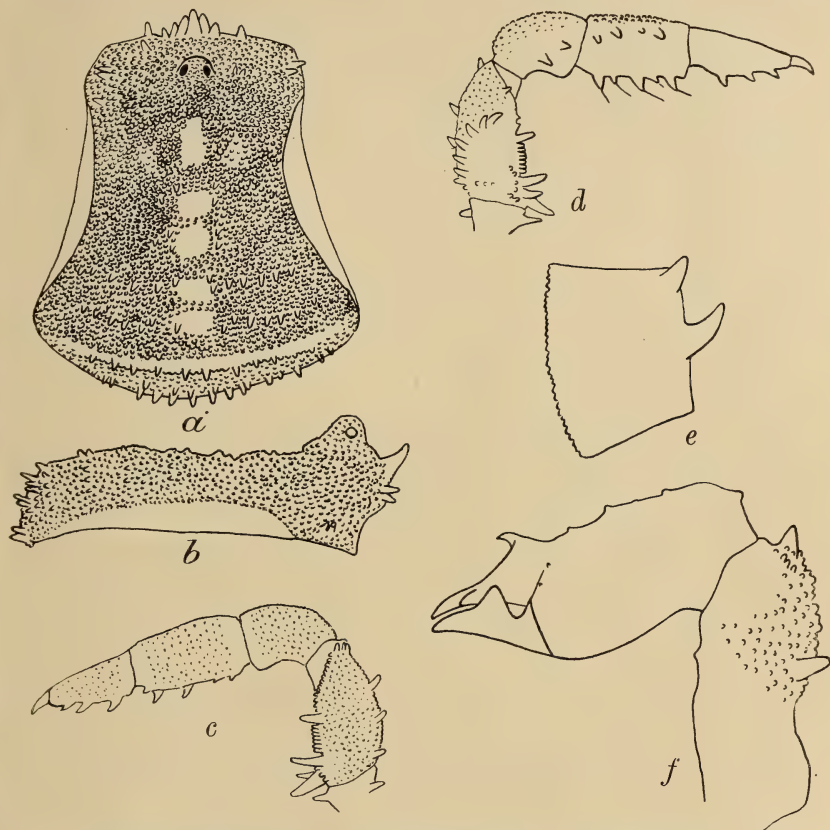


FIG. 52.—*Adaeum granulosum*. ♂: a, dorsal surface; b, body from side; c, palp from outer side; d, from inner side; e, patella of palp from above; f, chelicera.

Adaeum granulosum n. sp.

(Text-fig. 52, a-f.)

Colour blackish tinged with olive green above, lighter below. Dorsum as in fig. 52, a, uniformly and thickly covered with small round bead-like granules, the sides and some roughly quadrangular spaces in the middle smooth; anterior margin of carapace with about 6 large

contiguous tooth-like granules in front of the ocular tubercle, 2 conical granules at the antero-lateral angles of the carapace; ocular tubercle as in fig. 52, *b*, seen from the side, rounded and low; areas not defined by grooves or rows of enlarged granules except the last two which are represented by fairly regular transverse rows of conical granules; posterior border of dorsal scute and free tergites posteriorly with a row of enlarged conical granules, some smaller bead-like granules between them; sternites with a single row of bead-like granules in anterior half, these dense at the sides but thinning out in the middle, last sternite covered with granules except in the middle; stigma-bearing sternite and the cleft between it and coxa IV filled up with a broad strip of granules, the anterior portion adjacent to the genital operculum (sternite I) smooth; coxae almost smooth in the middle (especially IV) but the clefts forming the junctions with adjacent coxae filled up with bead-like granules; inferior surface of coxa I with granules, its anterior border with about 4 enlarged conical granules; genital operculum with some bead-like granules and about 6 cylindrical papilliform granules anteriorly.

Pedipalp covered with bead-like granules above, smooth below, seen from inner side as in fig. 52, *d*, from outer side as in fig. 52, *c*; patella with 2 distinct slightly curved teeth on inner side, a middle and a subapical one, the middle one the larger; tibia with 3 or 4 teeth on each side; chelicera unusually large and stout, segment I above with a middle and apical conical tooth; segment II with claws peculiarly modified as in fig. 52, *f*; movable finger with a large blunt lobe near its middle, immovable finger with a large sharp tooth near its base. Legs thickly covered with bead-like granules, the granules arranged in longitudinal rows on under surfaces of femora II–IV, a smooth inferior strip in the middle; femur I with 2 conical granules below at its base, 4–5 similar but smaller granules along its inner side; tarsal segments 3 : 9 : 4 : 4.

Measurements—Length of body 4, breadth 3·5, pedipalps 5 mm.

Type, 1 ♂, Swartberg Pass, 5000 feet altitude, near Prince Albert, Cape Province.

Adaeum squamatum n. sp.

(Text-fig. 53, *a-e*.)

Colour of body dark green, appendages lighter.

Anterior margin of carapace with an irregular row of 10–15 teeth varying in size but none especially large (fig. 53, *a*); anterior lateral

angles of carapace with 3 stout teeth, behind these a large tooth projecting outwards beyond the lateral margins of carapace; ocular tubercle seen from the side with several enlarged granules at its apex; granulation of dorsum of body as in fig. 53, *a*, covered with small round granules not forming a pattern, areas represented by a pair (the

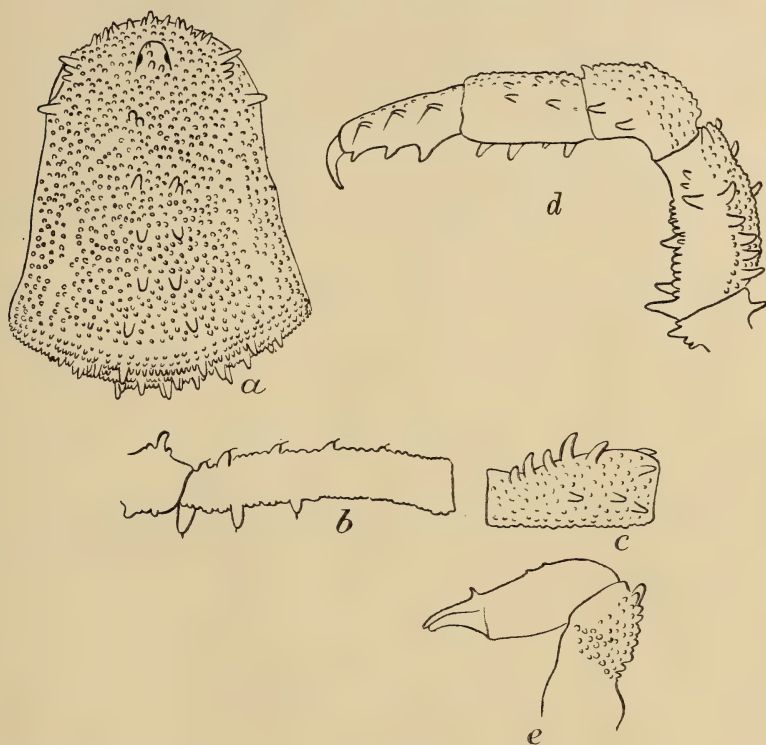


FIG. 53.—*Adaeum squamatum*. *a*, dorsal surface of body; *b*, femur I; *c*, femur of palp above; *d*, palp from inner side; *e*, chelicera.

individuals of these pairs sometimes doubled) of large conical granules in the middle, these quite distinct from the normal smaller granules; area V with about 6 large conical granules and 1 or 2 rows of smaller granules; free tergites with a transverse row consisting of about 8 enlarged conical granules connected by small round granules; sternites with an anterior row of small round closely contiguous granules, a row of well-separated small seta-tipped granules in the middle; inferior surfaces of all coxae granular throughout, a few larger round granules at the bases, coxa I with larger, more conical,

seta-tipped granules especially along its anterior margin; genital operculum with 10 fairly short seta-tipped papillae on its anterior margin, the segment to which it is attached (anterior portion of stigma-bearing sternite) with 2 fairly large round granules, one on each side.

Pedipalp: femur above on inner side near upper surface with a row of 5 conical teeth (fig. 53, *c*), the row curving downwards, 3 teeth on upper surface in distal half; pedipalp seen from inner side as in fig. 53, *d*. Chelicera: upper surface of segment I without a tooth or enlarged granule in the middle, 1 or 2 apical granules present (fig. 53, *e*), granules on the outer side near lower surface flattened and squamiform; immovable finger of segment II with a sharp tooth near its base; legs densely granular, femur I below armed as in fig. 53, *b*; tarsal segments 3: 10-11: 4: 4.

Measurements.—Length of body 2.8, pedipalps 2.5 mm.

Type, 1 ♀, Somerville, Eastern Cape Province. Type in Albany Museum, Grahamstown.

Gen. METADAEUM Roewer.

1923. Roewer, *Die Weberknechte der Erde*, p. 623.

Sternum narrowly triangular; terminal section of tarsus I with 2 segments, I with 4 segments; tarsus I with 3 segments, II with more than 6 segments, tarsi III and IV with 4 segments.

One species, Eastern Cape Province.

Metadaeum capense Roewer.

(Text-fig. 54, *a-c*.)

1923. Roewer, *Die Weberknechte der Erde*, p. 623, fig. 783, *a-c*.

Body in appearance and dorsal armature, ocular tubercle, and apices of coxae I-IV as in fig. 54, *a*; all free sternites with 1 transverse row of granules; genital operculum granular, anteriorly with 8 slender papillae; surfaces of coxae I-IV closely and coarsely granular; coxa I with 1 anterior row of tubercles. Chelicerae: segment I dorsally and segment II anteriorly coarsely granular; pedipalp seen from inner and outer sides as in figs. 54, *c*, *b*; legs powerful, I-IV from trochanter to metatarsus with close rugose granulation, calcaneus of legs I-IV short and conical; tarsal segments 3: 9-11: 4: 4; secondary sexual characters of ♂ present on leg I; femur below with 1 basal row of

3 tubercles. Colour of body reddish brown; all the spines and tubercles of the dorsum and appendages a lighter reddish yellow.

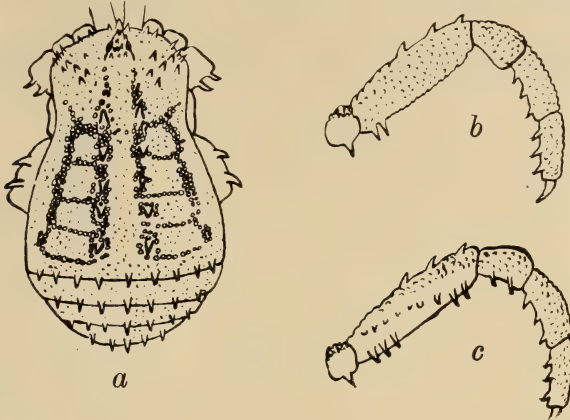


FIG. 54.—*Metadaeum capense*. ♂: a, dorsal surface of body; b, palp from outer; c, from inner side. (Copied from Roewer.)

Measurements.—Length of body 6, pedipalps 5; legs I–IV, 7 : 12 : 8 : 13 mm.

Types, 9 (♀♂), Port Elizabeth. Types in Roewer's collection.

This is probably only a species of *Adaeum* and will have to be included therein.

Gen. CRYPTADAEUM n. gen.

Most nearly resembling *Adaeulum*; tarsus I with 4 segments, tarsus II with more than 6, its terminal section consisting of 3 segments; sternum broadly triangular as in fig. 56, *d*; ocular tubercle rounded above; dorsal scute divided into median and lateral smooth shiny areas by rows of granules (fig. 55, *a*); femur of leg I armed below with long papillae in both sexes; tarsal segments 4 : 12–14 : 4 : 4; secondary sexual characters of ♂ present in pedipalp.

One species, Western Cape Province.

Cryptadaeum capense n. sp.

(Text-figs. 55, *a–h*; 56, *a–e*.)

♂. Colour deep brown, almost black.

Anterior margin of carapace with a row of numerous small close-set conical granules; dorsal scute divided into smooth shiny areas by

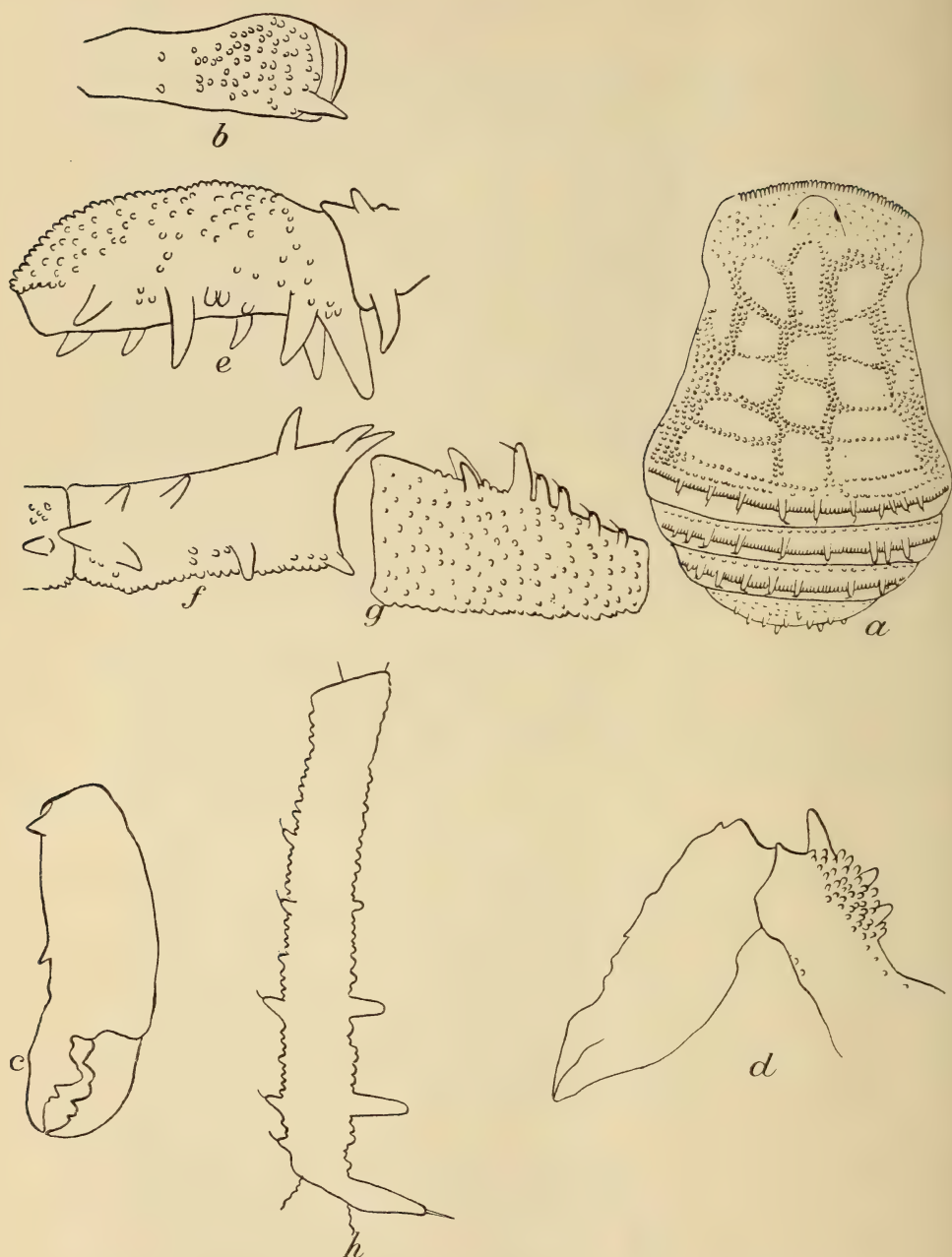


FIG. 55.—*Cryptadaeum capense*. ♂: *a*, dorsal surface of body; *b*, segment I of chelicera above; *c*, from the front; *d*, chelicera from side; *e*, femur of palp from outer side; *f*, from below; *g*, from above; *h*, femur I.

rows of granules arranged as in fig. 55, *a*; ocular tubercle rounded above, covered with small round granules, seen from the side as in fig. 56, *a*; posterior margin of dorsal scute with a row of 9-12 long cylindrical seta-tipped granules, the interspaces with a row of much smaller conical granules; free tergites I and II with an anterior row of



FIG. 56.—*Cryptadaeum capense*. ♀: *a*, body from the side; *b*, patella-tarsus of palp below; *c*, femur of palp from inner side; *d*, sternum; *e*, chelicera.

small rounded granules, in the middle a row of long cylindrical seta-tipped granules and immediately behind these a row of small conical granules (fig. 55, *a*), sternites with fine granulation in their anterior half or third, the rest smooth; coxae set wide apart from their opposite partners, uniformly and fairly densely granular, this granulation more dense at their distal extremities and in the grooves defining the coxae, the granules at the bases of the coxae bordering on the sternum not enlarged; coxa I with an anterior row of enlarged conical granules; genital operculum with small round seta-tipped granules but no cylindrical papillae (fig. 56, *d*). Pedipalp: trochanter and femur

seen from below as in fig. 55, *f*, trochanter below with 1 large conical tooth; femur below with 3 large conical teeth at its base, in addition to these 3 teeth on the inner side, 2 on the outer side; femur seen from the outer side as in fig. 55, *e*, inner surface of femur with 5 moderate teeth increasing in size distally (fig. 55, *g*), seen from above; whole of pedipalp closely granular above, tibia granular below, tarsus shiny and smooth below; patella below with 2 teeth on inner side, 0 on outer side, tibia below with 3 teeth on outer side, inner side with 3 teeth and in addition some small intermediate teeth, tarsus below with 3 teeth on each side. Chelicera: segment I with a granular area near its upper apex including a large tooth (fig. 55, *b*) seen from above, (fig. 55, *d*) seen from the side; segment II shiny, its anterior surface with a few sharp teeth (fig. 55, *c*) seen from in front. Legs: femur I below with 3 basal papillae (fig. 55, *h*); tarsal segments 4:12:4:4.

Measurements.—Pedipalps 5.2, length of body 5 mm.

♀. *Colour* and granulation as in ♂; pedipalp femur as in fig. 56, *c*, seen from inner side; patella, tibia, and tarsus as in fig. 56, *b*, seen from below; chelicera as in fig. 56, *e*; femur of leg I as in ♂; tarsal segments 4:14:4:4; the ♀♀ can be distinguished from the ♂♂ by the teeth of the pedipalps which are smaller in the ♀ than in the ♂, while the pedipalps themselves are smaller in proportion to the body length.

Measurements.—Pedipalps 3.5, length of body 4.8 mm.

Types, 4 ♂♂, 10 ♀♀, 2 juveniles, St James, Cape Peninsula.

Gen. MICRADAENUM n. gen.

Dorsal scute with 2 longitudinal rows of enlarged granules in the middle extending from ocular tubercle to almost the posterior margin of dorsal scute; sternum triangular; pedipalps very rugose but without any teeth or spines; tarsus I with 3, tarsus II with 4 segments; terminal section of tarsus I consisting of 2 segments, II consisting of 2 segments; tarsal segments of legs 3:4:4:4; body size small.

One species, Western Cape Province.

Micradæum rugosum n. sp.

(Text-fig. 57, *a-e*.)

Colour varying from brown to blackish, under surface lighter, metatarsi and tarsi of legs yellow; granulation of body not distinct and very coarse; anterior margin of carapace with a row of con-

tiguous granules, a group of 2 larger ones at the antero-lateral angles of the carapace; ocular tubercle as in fig. 57, *a*, seen in profile hardly rising above the level of the dorsal scute; dorsal scute and carapace with 2 continuous longitudinal rows of enlarged granules in the middle extending from ocular tubercle almost to posterior margin of scute; on each side some transverse rows of similar enlarged granules meeting the central rows and forming indistinct areas which are filled up with

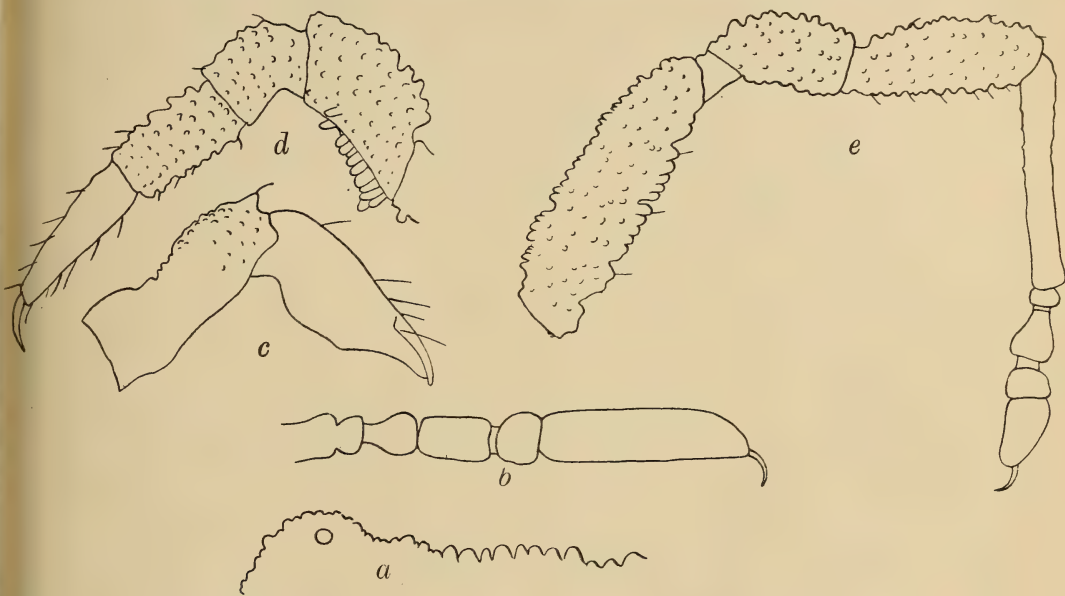


FIG. 57.—*Micradaeum rugosum*. *a*, ocular tubercle; *b*, tarsus II; *c*, chelicera; *d*, palp from outer side; *e*, leg I.

small particles of grit and sand; posterior margin of dorsal scute with a ridge of larger granules interrupted in the middle; free tergites covered with irregular coarse round granules, a ridge of larger granules interrupted in the middle forming their posterior margins; sternites in anterior half with round, coarse, close-set granules, in posterior half smooth; coxae uniformly and densely covered with more or less equal-sized granules, coxa I distinctly separate from remaining coxae which are fused and possess no grooves defining them; genital operculum with 7–8 seta-tipped papillae at its anterior margin and sides, remainder of its surface with smaller conical granules; sternum triangular, not so slender as in *Adaeulum*. Pedipalp as in fig. 57, *d*, all segments except tarsus strongly rugose above and at the sides, smooth or with

a few small granules below, without individual spines or teeth; femur below on outer side with a crest composed of 9-12 closely contiguous granules; remaining segments as in fig 57, *d*, tarsus more or less smooth, armed with a few stout setae; chelicera as in fig. 57, *c*; leg I as in fig. 57, *e*, femur, patella, and tibia thickly covered with round granules; seen from below these granules are disposed in regular longitudinal rows, from above they are more or less irregular; metatarsus with a few granules and fairly numerous setae, tarsal segments smooth with numerous setae; remaining legs similar in granulation to leg I, tarsal segments of leg II as in fig. 57, *b*; lateral prongs of claws of tarsi III and IV minute; tarsal segments 3:4:4:4.

Measurements.—Length of body 3.5, pedipalps 2 mm.

Type, I specimen (♂ or ♀?), Table Mountain slopes, Cape Town. Other specimens from Platteklip, Chapman's Peak, Newlands, Wynberg, Table Mountain.

Gen. LARIFUGA Loman.

1898. *Larifuga*, Loman, Zool. Jahrb. Syst., ii, p. 527.

1903. „ Pocock, Proc. Zool. Soc. London (1902), pt. 2, p. 402.

1914. „ Roewer, Arch. Naturg., lxxx, A, fasc. 12, p. 150.

1923. „ Roewer, Die Weberknechte der Erde, p. 623.

Dorsal scute with fine granulation either uniformly disposed or forming transverse rows dividing it into 4 areas; ocular tubercle either with a single apical spine or with several, but not rounded; areas with a pair of conical granules in the middle; free tergites with 2 rows of granules, the one consisting of minute, the other of enlarged conical granules; femur of pedipalp below with large stout teeth; chelicerae armed with a variable number of teeth at the dorsal apex of segment I; sternum roughly pentagonal; tarsi I, III, and IV consisting of 4 segments, II of 15-21 segments; terminal section of tarsus I with 2, tarsus II with 3 segments; calcaneus of metatarsus in all legs much shorter than astragalus; femur of leg I inferiorly armed both in ♀ and ♂. Secondary sexual characters of ♂: teeth on ventral surface of pedipalp femur much larger than in ♀ (*L. weberi* excepted); genital operculum longer than or as long as broad, in ♀ much broader than long; teeth at the dorsal apex of segment I of chelicerae longer than in the ♀; basal segment of tarsus I a little thickened, normal in ♀. Six species, Western Cape Province.

Key to species.

1. Dorsal scute divided into 4 definite smooth areas by distinct transverse rows of granules 2.
Dorsal scute not divided into definite smooth areas by distinct transverse rows of granules, or uniformly granular throughout 3.
2. Femur of pedipalp of ♂ armed at inner distal apex with a long stout spur-like tooth (fig. 60, b) *calcarata*, p. 456.
Femur of pedipalp of ♂ without such a tooth *weberi*, p. 461.
3. Segment I of chelicerae of ♂ with a stout tooth at its dorsal distal apex, as large as, or not much smaller than the large ventral teeth on pedipalp femur 4.
Segment I of chelicerae of ♂ with 1 or more teeth at its dorsal distal apex much smaller than the large ventral teeth on femur of pedipalp 5.
4. Anterior surface of segment II of chelicerae shiny or with a few scattered granules, tibia of ♂ pedipalp spined (fig. 58, c) *dentifer*, p. 451.
Anterior surface of segment II of chelicerae closely granular, tibia of ♂ pedipalp unspined (fig. 59, b) *granulosa*, p. 453.
5. Posterior margin of dorsal scute with either only 1 conical granule in the middle or this granule distinctly larger than the others of the row, dorsal scute with irregular transverse rows of granules *capensis*, p. 457.
Conical granules on the posterior margin of dorsal scute equal sized, dorsal scute uniformly granular without traces of transverse rows of granules
montana, p. 459.

The characters given for *L. rugosa* Guérin are too indefinite to include it in this key. It is also difficult to give a key for females alone as all of them reveal a good deal of similarity.

Larifuga dentifer n. sp.

(Text-fig. 58, a-j.)

♂. *Colour* olive brown, legs, chelicerae, and pedipalps with reticulate olivaceous markings; carapace and dorsal scute covered more or less irregularly with fine bead-like granules not forming smooth areas in the middle of the dorsal scute and more close set at the sides; ocular tubercle as in fig. 58, a, seen from the side; dorsal scute with a pair of stout conical granules in the middle of area IV, these absent in areas I-III where they are represented by obsolete granules placed nearer to each other than those of area IV; posterior margin of dorsal scute (area V) with a transverse row of 5 stout conical granules, I and II free tergites with transverse rows of approximately 11-13 similar granules, III free tergite with a rather irregular row varying in size; sternites finely shagreened, each in the middle with a transverse row of small round granules, these granules widely spaced; inferior surface of coxa I thickly covered with conical seta-tipped

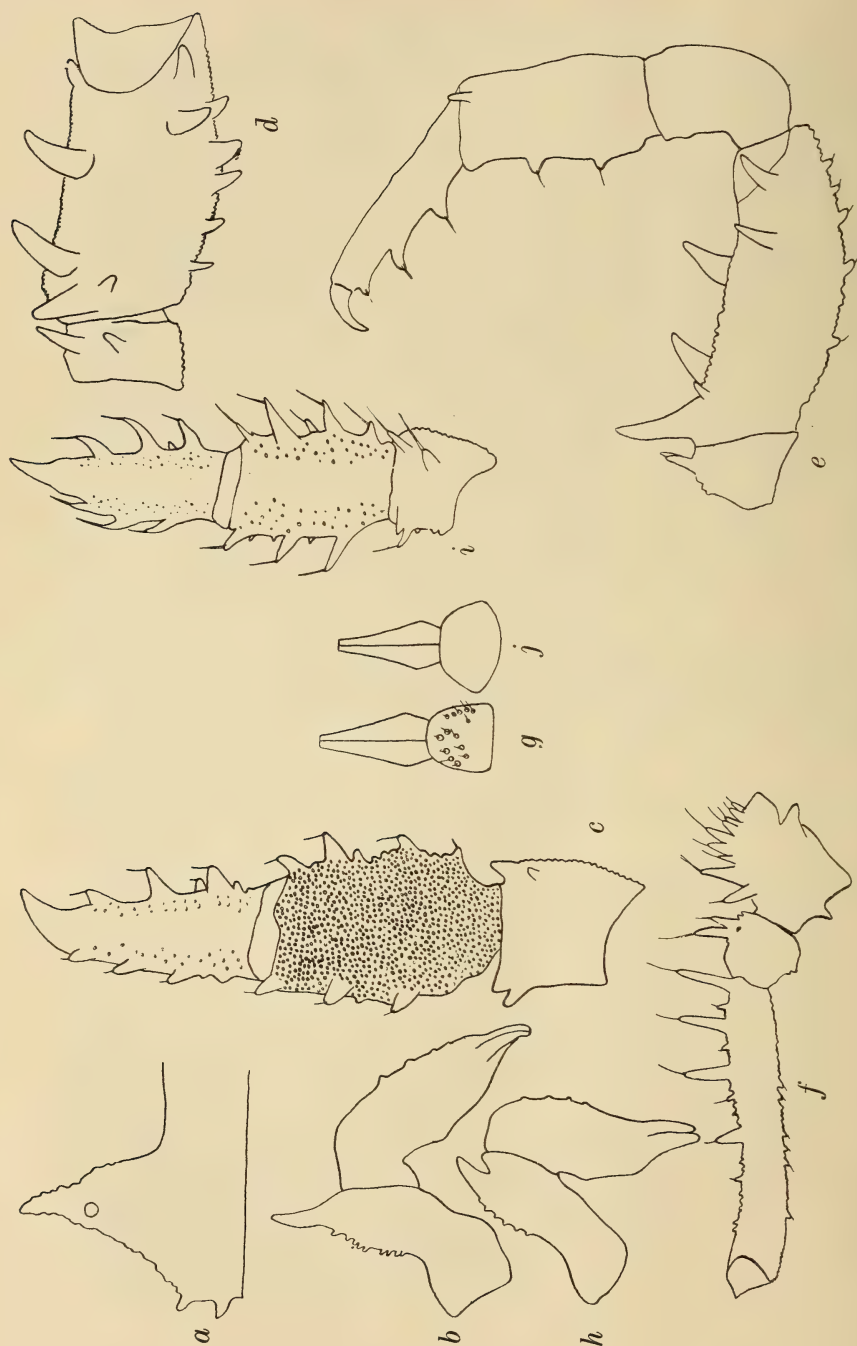


FIG. 58.—*Larifuga dentifer*. ♂: *a*, ocular tubercle; *b*, chelicera; *c*, patella-tarsus of palp below; *d*, femur of palp from below; *e*, palp from inner side; *f*, sternum. ♀: *h*, chelicera; *i*, patella-tarsus of palp below; *j*, sternum.

granules becoming longer and stouter towards the distal apex, coxae II and III fairly thickly, IV sparsely covered with round granules; posterior distal margin of II with 3-4 long conical granules, anterior distal margin of IV with 1 long and 2-3 shorter granules; posterior margin of IV near the sides with some small granules bridging the cleft between it and the stigma-bearing sternite to meet some similar granules on the anterior surface of the latter. Pedipalp seen from the inner side as in fig. 58, *e*, seen from below (figs. 58, *c*, *d*); trochanter with 2 ventral teeth; femur below on the outer side with 2 large teeth at its base, a small one between them situated more mesially, 1 large middle one and a small apical one; inner side with 2 large teeth near the apex and 5 irregularly placed smaller ones; patella below with a moderate apical tooth at each side, in addition a small tooth in the middle on the inner side; both tibia and tarsus with 3 teeth on each side; whole of ventral surface of tibia evenly covered with small round granules, tarsus with these granules only at the sides; chelicera as in fig. 58, *b*, seen from the side, segment I with a long stout tooth above at its apex, upper surface granular, the sides finely and closely granular, segment II anteriorly smooth except for a few indistinct granules; leg I with femur armed below as in fig. 58, *f*, tibia without conical spines, with a few weak setae; femora of remaining legs unarmed; genital operculum and sternum as in fig. 58, *g*, the former longer than wide, provided with a few spines arising from small spherical granules; tarsal segments 4:17:4:4.

Measurements.—Length of body 5.9, breadth 4.3, pedipalps 8 mm.

♀. *Colouring* as in ♂; pedipalps much smaller in proportion to body than in ♂; spination of body as in ♂. Pedipalps: trochanter with 1 small spine; femur armed as in ♂, the teeth smaller; patella as in ♂, the teeth larger; tibia and tarsus as in fig. 58, *i*, seen from below, tibia with 3 main teeth on each side larger and sharper than in ♂, with coarse granules at the sides below; sternum and genital operculum as in fig. 58, *j*; femur I armed below as in ♂; chelicera as in ♂, the tooth at the apex of segment I much shorter (fig. 58, *h*).

Measurements.—Length of body 5.3, breadth 4.4, pedipalps 6.2 mm.

Types, 3 ♂♂, 3 ♀♀, River Zonder End, Caledon, Cape Province.

Larifuga granulosa n. sp.

(Text-fig. 59, *a-g*.)

♂. *Colour* a rich deep brown, the distal segments of legs olivaceous; anterior upper margin of carapace with a transverse row of about

10 small granules; ocular tubercle seen in profile as in fig. 59, *a*; dorsal scute with uniformly placed small fine granules not defining definite areas as, e.g., in *L. weberi* Loman, see Roewer's Weberknechte



FIG. 59.—*Larifuga granulosa*. ♂: *a*, ocular tubercle; *b*, palp from outer side; *c*, femur of palp below; *d*, patella-tarsus of palp below; *e*, chelicera; *f*, femur I. ♀: *g*, chelicera.

der Erde, p. 624, text-fig. 784, *a*; dorsal scute in the middle with 4 moderate pairs of enlarged granules subequal in size, the first (anterior) pair a little smaller; posterior margin of dorsal scute with a transverse row of conical granules, these smaller than in *L. dentifer*; free tergites I and II with an anterior marginal row of minute granules, their posterior margins with a row of about 10 conical granules, the interspaces of these filled up with minute granules, III free tergite

covered with minute granules, a transverse row of conical granules in the middle; sternites with 2 rows of small round granules, an anterior marginal row which is close set and a row situated a little anterior to the middle consisting of a few widely but regularly spaced granules, last sternite uniformly covered with small granules; inferior surface of coxa I densely granular, 2 conical tooth-like granules at its distal anterior margin much larger than any of the others, coxae II-IV sparsely granular, the cleft between coxa IV and the stigma-bearing sternite filled up with numerous small round granules. Pedipalp seen from the outer side as in fig. 59, *b*, from below as in fig. 59, *c*; trochanter below with 2 teeth; femur below with a group of 3 large teeth basally arranged in the form of a triangle; distally to these on the inner side 3 teeth, the apical one small, on the outer side 2 teeth; a row of 4 intero-dorsal teeth (3 of them can be seen in fig. 59, *c*) and 4-5 small teeth dorsally; patella unarmed, tibia with 1 small tooth at inner apex, tarsus with 2-3 inconspicuous teeth flanking the inner edge (fig. 59, *d*); all segments of pedipalp above and below closely and evenly covered with small round granules; chelicera as in fig. 59, *e*, differing from *L. dentifer* in having the anterior surface and sides of segment II regularly granular and with a stout tooth at the base of the fingers of the claw on the inner side; neither the femur of leg I nor of remaining legs armed inferiorly with long conical spines as in *L. dentifer* (fig. 59, *f*); tarsal segments 4 : 21 : 4 : 4.

Measurements.—Length of body 7.6, breadth 4.9, pedipalps 7.5 mm.

♀. As in ♂ but differing in the spination of the pedipalp and chelicerae; trochanter below with 1 large and 1 small tooth; femur below with 2 large teeth at the base, the third inner one being reduced, in addition 1 middle and 1 apical tooth on the inner side, 2 apical teeth on the outer side, 4 intero-dorsal teeth; patella, tibia, and tarsus armed similarly to those of the ♀ of *L. dentifer* (fig. 58, *i*); chelicera as in fig. 59, *g*, the anterior surface of segment II with scattered granules, smooth in places; the armature of segments I and II less pronounced than in the ♂; femur of leg I as in ♂; genital operculum broader than long (in the ♂ it is longer than broad).

Measurements.—Length of body 7.3, breadth 4.8, pedipalps 6.1 mm.

Types, 12 ♂♂, 8 ♀♀, River Zonder End, Caledon, Cape Province. Other localities: 2 ♂♂, 7 ♀♀, Bredasdorp; 3 ♂♂, 9 ♀♀, Houw Hoek, Caledon; 5 ♀♀, 1 ♂, Caledon; 1 ♂, Elim, Bredasdorp.

Larifuga calcarata n. sp.

(Text-fig. 60, a-j.)

♂. Colour brown to black, pedipalps brown, distal segments of leg IV light brown; anterior upper margin of carapace with a transverse row of about 12 strong tooth-like granules; ocular tubercle seen in profile strongly armed with sharp tooth-like granules, not ending in a single pointed spine (fig. 60, a); dorsal scute divided into



FIG. 60.—*Larifuga calcarata*. ♂: a, ocular tubercle; b, femur of palp below; c, patella-tarsus of palp below; d, chelicera; e, femur I; f, tarsus I. ♀: g, femur of palp below; h, patella-tarsus of palp below; i, chelicera; j, ocular tubercle.

4 distinct smooth areas by transverse rows of minute granules; these areas each with a pair of small tubercles in the middle with clusters of minute granules between or around them; the sides of the dorsal scute also with aggregations of minute granules; posterior margin of dorsal scute with a transverse row of enlarged granules, their interspaces filled up with minute granules; free tergites I and II with an anterior bordering row of minute granules and posterior to this a row of enlarged conical granules, III free tergite more or less covered with minute granules, a row of conical granules in the middle; sternites with an anterior close-set and a middle widely separated

row of small round granules; inferior surface of coxa I covered with round granules arranged in 2 rows running parallel to its longitudinal axis, coxae II–IV with some scattered similar granules, cleft between coxa IV and stigma-bearing sternite filled up with small round granules. Pedipalp seen from below (fig. 60, *b*); trochanter below with 2 teeth, the outer larger than the inner one; femur below with 2 large teeth at its base, on the outer side a middle and an apical tooth, the apical larger than the middle one, inner side with 1 very large spur-like tooth at the apex (its length about $\frac{2}{3}$ the length of femur below), 1–2 intero-dorsal teeth, 3 small blunt dorsal teeth; patella, tibia, and tarsus spined as in fig. 60, *c*, seen from below, on the left pedipalp there are 1 or 2 small teeth on the outer side of tibia in addition to those shown in the figure; pedipalp weakly granular, tibia ventrally more strongly so; chelicera as in fig. 60, *d*, 3–4 small teeth at apex of segment I (only 1 seen in the figure from the side), teeth small but not granular, segment shagreened at the sides, segment II with 2 little teeth anteriorly in the middle. Leg I with femur as in fig. 60, *e*, tarsal segments as in fig. 60, *f*; tarsal segments 4 : 21 : 4 : 4.

Measurements.—Length of body 4·5, breadth 3·8, pedipalps 5·7 mm.

♀. As in description of ♂, the tooth-like granules of the anterior margin of carapace smaller; ocular tubercle as in fig. 60, *j*; pedipalp armed as in figs. 60, *g*, *h*, above rugose, below shiny or with some round granules at the sides, femur dorsally with 3–4 granules, trochanter with 1 large tooth below; chelicera with segment II smooth (fig. 60, *i*); leg I with femur armed as in ♂; tarsal segments 4 : 17 : 4 : 4.

Measurements.—Length of body 6, breadth 4, pedipalps 4·3 mm.

Types, 1 ♂, 4 ♀♀, Humansdorp, Cape Province.

Larifuga capensis n. sp.

(Text-fig. 61, *a–g*.)

♂. *Colour* black, centre of dorsal scute, eye tubercle and a patch on each side of the latter light brown, legs black, light brown at the joints, pedipalp with femur blackish, below brown, remaining segments blackish, the joints light brown, the large basal teeth of the femur blackish; upper anterior margin of carapace armed with a row of 11–13 conical granules; dorsal scute divided into areas by transverse rows of minute granules but not distinctly so, the rows broken and irregular; ocular tubercle seen in profile as in fig. 61, *e*;

areas of dorsal scute with 4 median pairs of enlarged granules, the fourth pair the largest, the other 3 pairs considerably smaller and subequal, around and between these granules aggregations of granules ; posterior margin of dorsal scute with 2 enlarged conical granules in the middle, free tergites with an anterior row of minute granules and a

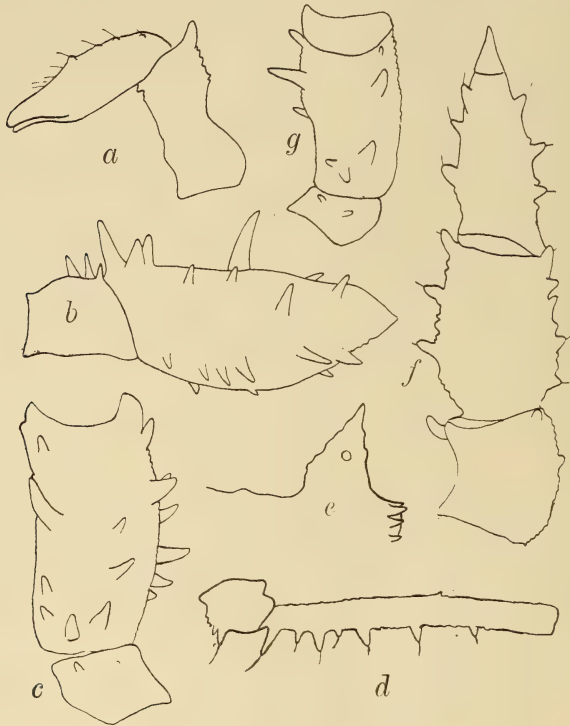


FIG. 61.—*Larifuga capensis*. ♂: a, chelicera; b, femur of palp from inner side; c, from below; d, femur I; e, ocular tubercle; f, patella-tarsus of palp below. ♀: g, femur of palp below.

middle row of enlarged conical granules, their interspaces filled up with minute granules, those of III rather irregular; sternites finely shagreened with an anterior bordering row of minute round granules, a row of larger granules in the middle (4–6 times as large as the granules of the anterior row); inferior surface of coxa I covered with round granules growing successively longer and more conical distally, 3–4 near distal anterior apex much longer than the rest, coxae II–IV with smaller and more scattered granules, coxa IV with very few and small granules bridging the cleft between it and the stigma-bearing sternite.

Pedipalp seen from below as in fig. 61, *c*; trochanter sometimes with 1, usually with 2 teeth below, the outer the largest, the inner the smallest; femur below with 3 basal teeth, besides these a middle and an apical tooth on the outer side, the apical one small; on the inner side 2 moderate teeth near the large basal ones and 2 large teeth near apex, the latter situated a little nearer the dorsal surface than the former; 6 large intero-dorsal teeth arranged in a rough Λ (fig. 61, *b*), 3 small dorsal teeth; remaining segments spined as in fig. 61, *f*; chelicera with segment I granular above with a moderate tooth at its dorsal apex, segment II shiny and smooth except for a row of denticles provided with setae (fig. 61, *a*); leg I with femur armed as in fig. 61, *d*; tarsal segments 4 : 17 : 4 : 4.

Measurements.—Length of body 5, breadth 3·6, pedipalps 7 mm.

♀. *Colour* black, only the enlarged granules and posterior margins of the free tergites yellow brown, appendages variegated as in ♂; dorsal scute more densely granular than in the ♂, the areas much less distinctly defined, ocular tubercle as in ♂; posterior margin of dorsal scute with a row of about 6 conical granules. Pedipalp seen from below as in fig. 61, *g*, trochanter below with 2 small equal-sized teeth, femur with 2 large and 2 small intero-dorsal teeth and 3 small dorsal granules; remaining segments as in the ♀ of *L. calcarata*; chelicera with the tooth at the dorsal apex of segment I a little shorter than in the ♂; femur of leg I as in ♂; tarsal segments I, 4; II, ?; III, 4; IV, ?.

Measurements.—Length of body 5·7, breadth 4, pedipalps 5·5 mm.

Types, 1 ♂, 1 ♀, Chapman's Peak, Cape Peninsula. Other localities: Table Mountain above Klassenbosch, Newlands, Wynberg, Platteklip Ravine, all Cape Peninsula.

Larifuga montana n. sp.

(Text-fig. 62, *a-g*.)

♂. Anterior upper margin of carapace with a transverse row of about 10 tooth-like granules, 2 at the antero-lateral angle of the carapace, the distal one the larger; ocular tubercle seen in profile as in fig. 62, *a*, with a tooth-like granule on each side posteriorly; dorsal scute with fairly densely and uniformly distributed small granules not dividing it into areas by means of transverse rows, with 4 equal-sized pairs of enlarged granules; posterior margin of dorsal scute with a transverse row of 8 conical granules; free tergites with 1 anterior row of minute granules and a posterior row of enlarged conical granules, the interspaces filled up with minute granules, the

anterior row of minute granules doubled in tergites II and III; sternites with a close-set anterior marginal row of small granules and a middle row of equal-sized but more widely separated granules; inferior surface of coxa I covered with conical granules increasing in size distally, the 2 distal granules along the anterior margin distinctly larger than the others, coxa II sparsely covered with round granules,

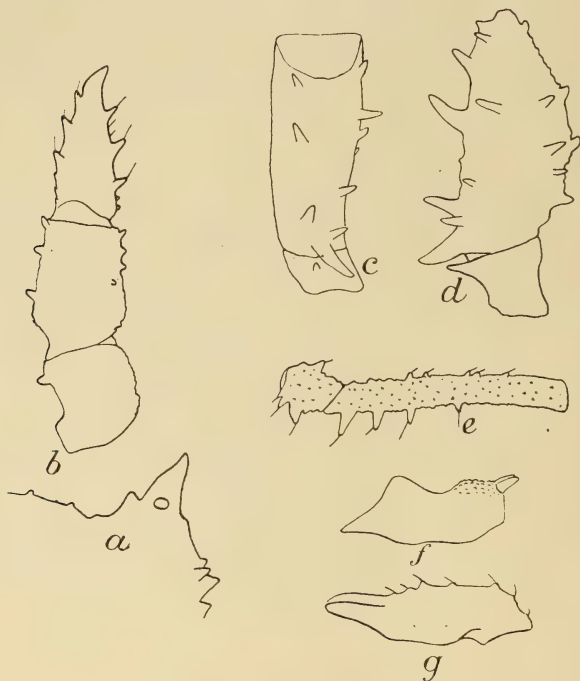


FIG. 62.—*Larifuga montana*. ♂: *a*, ocular tubercle; *b*, patella-tarsus of palp below; *c*, femur of palp below; *d*, from inner side; *e*, femur I; *f*, segment I; *g*, segment II of chelicera.

III and IV with a few scattered granules, cleft between coxa IV and stigma-bearing sternite filled up with numerous small round granules. Pedipalp seen from below (fig. 62, *c*); trochanter with 1 tooth; femur basally with 3 teeth, the inner one small, outer side with 1 middle and 1 subapical tooth, the middle larger than the subapical one; inner side with 3 moderate teeth, 3 intero-dorsal teeth; 2-3 dorsal teeth; femur seen laterally from inner side as in fig. 62, *d*; patella, tibia, and tarsus below as in fig. 62, *b*; whole of pedipalp above with fairly even granulation, below tibia with uniform fine granulation,

tarsus shiny; chelicera with segment I granular above, 2-3 small teeth at distal apex, segment II smooth anteriorly except for a few indistinct granules (figs. 62, *f, g*); femur of leg I armed as in fig. 62, *e*; tarsal segments 4: 13-16: 4: 4.

Measurements.—Length of body 4.7, breadth 3.5, pedipalps 5.5 mm.

♀. As in ♂ but dorsal scute more densely granular; free tergites with more than 1 row of minute granules, II with at least 3, III with the space between anterior and posterior rows almost entirely filled up with minute granules; femur of pedipalp as in ♂, but seen from below the outer apical tooth absent or minute, the inner basal tooth obsolete, the 3 intero-dorsal and dorsal teeth larger than in the ♂; remaining segments of pedipalp spined as in ♀ of *L. calcarata*; femur of leg I and chelicerae as in ♂; tarsal segments 4: 13-15: 4: 4.

Measurements.—Length of body 5.4, breadth 3.4, pedipalps 4 mm.

Types, 1 ♂, 2 ♀♀, Simonstown, Cape Province. Numerous other specimens of both sexes from St. James, Hout Bay, Kalk Bay, Bergvliet, Newlands, all Cape Peninsula.

Larifuga weberi Loman.

(Text-fig. 63, *a-f*.)

1898. Loman, Zool. Jahrb. Syst., ii, p. 527, t. 31, f. 18-23.

1914. Roewer, Arch. Naturg., lxxx, A, fasc. 12, p. 151, f. 48.

1923. Roewer, Die Weberknechte der Erde, p. 624, fig. 784, *a-g*.

Colour of body a rich reddish brown, appendages lighter distally.

♂. Appearance and armature of body as in fig. 784, *a*, Die Weberknechte der Erde, Roewer, p. 624; anterior upper margin of carapace with a row of about 9 stout tooth-like granules, 2 at each latero-anterior angle of carapace, the distal one much the larger; dorsal scute with regular transverse rows of granules dividing it into 4 smooth areas, each area with a pair of conical granules in the middle, these small, the fourth pair a little larger; conical granules of posterior margin of dorsal scute and free tergites large; sternites shagreened with a close-set anterior marginal row of small granules and a middle row of larger granules 2-3 times the size of anterior granules; inferior surface of coxa I covered with conical granules, coxae II-IV more or less smooth with some scattered granules, a row of small granules between them, posterior margin of coxa IV and anterior margin of stigma-bearing sternite each with a straight regular row of small granules, these rows meeting at the sides; genital operculum longer

than broad, roughly triangular in shape. Pedipalp: trochanter with 2 subequal teeth below, the inner one which is the shorter sometimes absent; femur seen from below (fig. 63, *b*) with 2 large basal teeth, these much the largest teeth on the ventral surface, the remainder

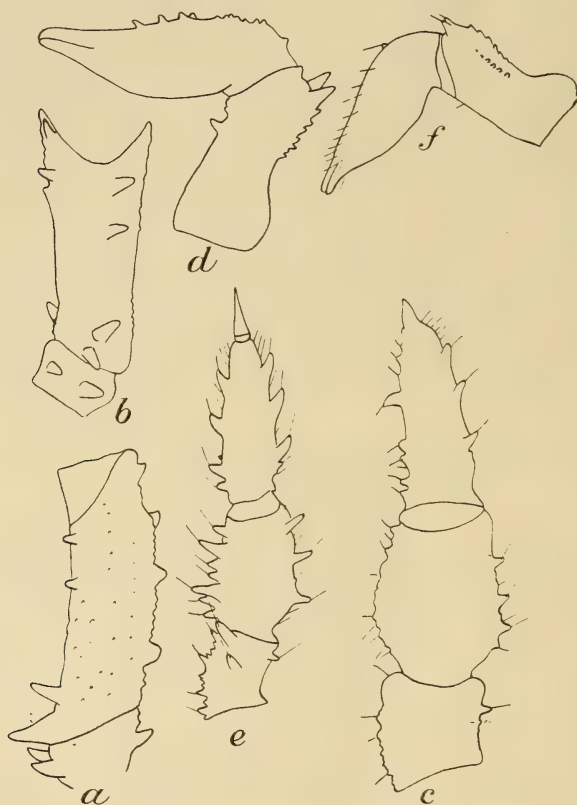


FIG. 63.—*Larifuga weberi* Loman. ♂: *a*, femur of palp from outer side; *b*, from below; *c*, patella-tarsus below; *d*, chelicera. ♀: *e*, patella-tarsus of palp below; *f*, chelicera.

being small; on the outer side 2 small teeth near the apex, on the inner side 2 small teeth near the apex about as far from each other as those of the outer side but both situated a little more distally; a row of 4 small intero-dorsal teeth and a row of about 4 dorsal teeth; patella, tibia, and tarsus seen from below as in fig. 63, *c*, patella and tibia practically unarmed, tibia with 3 small teeth on the outer side, tarsus with 3 small teeth on the outer side and 1 distinct tooth on the

inner side; chelicera (fig. 63, *d*) with dorsal surface of segment I granular, its distal edge with a row of 3-4 small teeth, the inner one largest, the rest becoming successively smaller, the distal half of its inner surface shagreened, the proximal half shiny, below with a tooth-like granule near the apex; segment II shiny, its anterior surface with some coarse irregular granules; femur of leg I armed as in fig. 784, *f*, *Die Weberknechte der Erde*, Roewer, p. 624; tarsal segments 4 : 15-22 : 4 : 4.

Measurements.—Length of body 5·6, breadth 4, pedipalps 6·5 mm.

♀. As in description of ♂; pedipalp smaller than in ♂; trochanter below with 1 tooth above, 1 below; femur with 4 teeth above; patella as in fig. 63, *e*, seen from below with 2 inner spines, tibia and tarsus with 3 spines on each side; chelicera (fig. 63, *f*) with the 4 little teeth bordering the distal upper edge of segment I much reduced but present, seen from above there are behind these teeth some rows of small granules and an intero-dorsal row of about 4 small granules; in the ♂ the first segment of tarsus I is swollen and thicker than the other segments, in the ♀ all the segments are of an equal thickness; femur I armed below as in ♂; tarsal segments 4 : 20 : 4 : 4.

Measurements.—Length of body 6, pedipalps 5·5 mm.

Description and figures based on a ♂ and ♀ taken with about 200 adult specimens collected at Knysna; these have been carefully compared in all details with cotypes (♂ and ♀) sent to us from the Zoological Museum, Amsterdam, and agree in all respects with them; the above description only differs from the description in *Die Weberknechte der Erde*, p. 264, in two respects: (*a*) 2 instead of 1 tooth on the ventral surface of trochanter of pedipalp, and (*b*) 1 tooth-like granule on the ventral surface of segment I of the chelicerae (fig. 784, *g*, in Roewer's description shows 3); in the above two characters the cotypes agree with the description given above.

This species is easy to distinguish from all others of the genus by the fact that all the teeth on the ventral surface of the pedipalp femur except the 2 basal ones are very small, almost obsolete; the teeth on the pedipalp of the ♂ are actually smaller than those of the ♀, while the reverse is the case in all the other species. *L. weberi* resembles *L. calcarata* from Humansdorp most closely, but differs markedly from it in the absence of a long tooth at the inner apex of the pedipalp femur.

Gen. MONTADAEUM n. gen.

Dorsal scute grooved as in fig. 64, *a*, the four areas with transverse rows of coarse round granules, the central pair in each area a little larger than the others; ocular tubercle ending in a single spine provided at its base with round smooth granules; sternum (fig. 64, *d*) distinctly pentagonal, much broader than in other genera of *Adaeinae* ($\frac{2}{3}$ as wide as long); pedipalps weakly armed, femur below with only 1 or 2 large teeth, but strongly rugose; neither femur of leg I nor of other legs armed inferiorly as in *Larifuga*; chelicerae unarmed, with weak granulation; calcaneus much shorter than astragalus in legs I-IV; tarsus I with 5 segments (in the ♀♀ 4 only), II with 13-17, III and IV with 4 each; body stout and large.

One species, Western Cape Province.

Montadaeum purcelli n. sp.

(Text-fig. 64, *a-i*.)

Colour blackish brown, the distal segments of the appendages lighter; dorsal scute with indistinct grooves dividing it into areas provided with round coarse granules varying a little in size, these granules more numerous posteriorly to and at the sides of the ocular tubercle (fig. 64, *a*); the central pair of granules in each area a little larger than the others in the row; ocular tubercle seen in profile as in fig. 64 *b*; upper anterior margin of carapace with a row of round moderate-sized granules smaller than those found on other parts of carapace and dorsal scute; free tergites with an anterior marginal row of minute granules and a middle row of large round granules; sternites with 1 row of well-separated small granules in the middle; coxa I on its inferior surface with coarse conical granules, II-IV sparsely covered with round granules, coxa IV with 4-5 elongated granules on its posterior margin at the sides bridging the cleft between it and the stigma-bearing sternite. Pedipalp: trochanter below with 1 large tooth and a smaller one on each side; femur below with 1 enlarged tooth at the base in the middle (figs. 64, *e, f*), a row of 3 denticles on the outer side, the apical one the largest, a small apical tooth on the inner side; femur covered with coarse granules except in the middle below, above with 2 rows of tooth-like granules tipped with setae, the inner row consisting of 6, the outer of 5 granules, the granules of the inner row larger than those of the outer (fig. 64, *g*); patella and tibia unarmed, their ventral surfaces covered with closely

packed round smooth granules; tarsus flattened, comparatively long and slender, its ventral surface slightly concave with 3 blunt teeth on each side (fig. 64, *h*); chelicera (fig. 64, *c*) stout, unarmed, segment I shagreened at the sides and above, a few small granules below; segment II smooth, its anterior surface with a row of 4 denticles, the third large, the fourth small; femur of leg I not armed with conical spines but rugose, remaining femora similar; tarsus I with 5 segments (in one leg 6), the terminal section consisting of 2 segments (fig. 64, *i*); tarsal segments I, 5-6; II, 15-17; III, 4; IV, 4.

Measurements.—Length of body 7·2, breadth 5·8, pedipalps 8·2 mm.

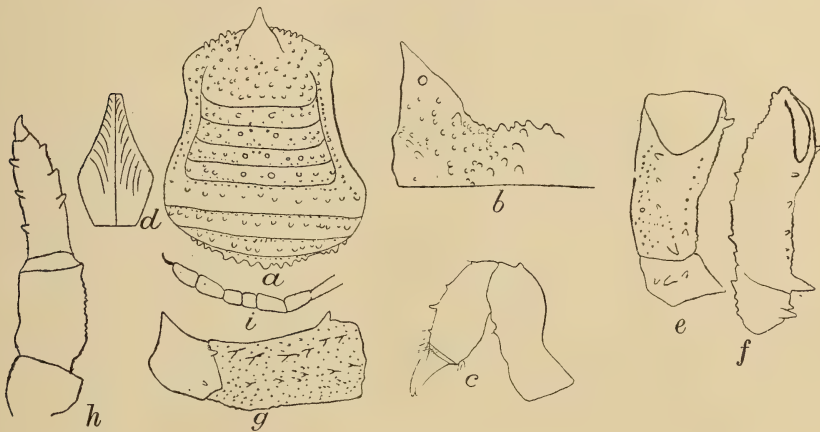


FIG. 64.—*Montadaeum purcelli*. ♂: *a*, dorsal surface of body; *b*, ocular tubercle; *c*, chelicera; *d*, sternum; *e*, femur of palp below; *f*, from inner side; *g*, above; *h*, patella-tarsus of palp below; *i*, tarsus I.

♀. Closely resembling ♂, pedipalps smaller and shorter than in ♂, femur seen from above slender at the base and broadening apically, where it is almost twice as broad as at the base; whole of femur strongly granular except a strip in the middle below which is smooth; armature as in ♂ except that patella has 2 indistinct teeth on the inner side, tibia 3 outer, 2-3 inner lateral teeth, tarsus 3 teeth on each side larger than in ♂; chelicerae and femur of leg I as in ♂; genital operculum distinctly broader than long, in ♂ as long as broad or a little longer than broad; tarsal segments I, 4; II, 13-15; III, 4; IV, 4.

Measurements.—Length of body 7·6, breadth 6·1, pedipalps 6·4 mm.

Types, 2 ♂♂, 2 ♀♀, Bergvliet, Cape Peninsula.

PARADAEUM n. gen.

Sternum as in fig. 65, *b*, narrow, parallel-sided and rod-like in anterior half, then widening suddenly and forming a roughly pentagonal figure which is as wide as or a little wider than long. Body and appendages rugose, covered with small bead-like granules, no greatly enlarged teeth or granules. Stigmae clearly visible, no enlarged conical granules bridging the cleft between coxa IV and stigma-bearing sternite; tarsus I consisting of 4, tarsus II of more than 6 segments; terminal section of I consisting of 2, II of 3 segments.

Paradaeum rattrayi n. sp.

(Text-fig. 65, *a-e*.)

Colour olive green without dark infuscations.

Dorsal surface entirely but not thickly covered with small bead-like granules, no enlarged club-shaped or tooth-like granules; these bead-like granules slightly more dense at the sides of and posterior to the ocular tubercle than elsewhere, those of the four areas of the dorsal scute a little denser in the middle, forming ill-defined transverse strips; anterior margin of carapace without enlarged teeth or granules; ocular tubercle (fig. 65, *a*), conical and rounded at its apex, unarmed; areas I-IV with a pair of granules (sometimes duplicated) in the middle, arranged as in *Larifuga*; these granules while much larger than the bead-like granules are yet indistinct and not clearly visible to the naked eye; free tergites with scattered bead-like granules and an irregular transverse row of larger granules near their posterior border; sternites with bead-like granules on their anterior halves, smooth on posterior halves; last sternite covered with scattered bead-like granules; coxae below uniformly but not densely covered with bead-like granules, some larger ones near their bases; coxa I with enlarged conical seta-tipped granules, those along the anterior margin larger than the rest; genital operculum without conical papillae but with some setae along its anterior margin (fig. 65, *b*). Pedipalp as in fig. 65, *d*, covered entirely (a little less strongly on ventral surface) with small bead-like granules; trochanter with 2 teeth below, the outer larger than the inner one; femur below with 3 large teeth on the outer side, 2 near the base, 1 near the apex, these teeth decreasing successively in size distally; inner side with 1 small tooth near the base, 2-3 about the middle, and 2 at apex, the most distal of these latter the smaller; under surface of femur in proximal half matt, without bead-like granules;

patella with 2 small teeth on inner side, tibia with 2 or 3 teeth on each side, tarsus with 3 teeth on each side. Chelicera: segment I above in distal $\frac{2}{3}$ with small round granules, a stout conical tooth at upper apex, the sides matt; segment II smooth at the sides, anterior surface with some small sharp teeth and some stout setae near apex (fig. 65, e).



FIG. 65.—*Paradaeum rattrayi*. a, body from the side; b, sternum; c, tarsus I; d, palp from outer side; e, chelicera.

Leg I without armature, rugose, basal segment of tarsus long, not much shorter than the sum of remaining segments (fig. 65 c); terminal section of tarsus I consisting of 2, II of 3 segments; tarsal segments 4 : 13-16 : 4 : 4.

Measurements.—Length of body 5·7, breadth 4·6, pedipalps 5 mm.

Types, 3 ♀♀ (?), Hogsback, Amatola Mountains, Eastern Cape Province. Collected by Dr. G. Rattray. Types in the Albany Museum, Grahamstown.

C. SUBORDER PALPATORES.

Two eyes (seldom blind), one on each side of a tubercle or frontal process situated in the middle of the carapace or near its anterior margin (fig. 68, *a*) ; openings of odoriferous glands not situated on a small cone but usually distinctly visible at the lateral margins of the carapace behind coxa I ; both the tergites of the prosoma recognisable, or completely fused with the carapace and not apparent ; abdomen with 9 tergites, the terminal one the anal operculum ; tergites I-V fused into a chitinous or soft scute, and this scute demarcated from the 2 tergites of the prosoma by a distinct transverse groove ; sternites II-VII distinct, sternites VIII and IX when present, together with the anal operculum and vestiges of the original IX sternite when this is present, forming the corona analis ; sternite I more or less retained as arculi genitales ; sternite II with a distinct genital operculum and with 2 stigmae ; pedipalp thin, usually slender, antenniform, all segments without long spines or teeth, tarsus with or without a short weak terminal claw (figs. 68, *e* ; 67 *d*) ; maxillary lobe of coxa I distinct, movable ; maxillary lobe of coxa II either long and movable, or short and almost immovable, or absent ; labium present, its chitinous portion at least medially united with the maxillary lobe of coxa I by a soft membrane ; sternum very short, at most hardly as long as broad ; coxae I-IV either immovably fused together or freely movable. Legs : leg I always shorter than leg II, tarsi I-IV with 1 terminal claw ; penis long, often very long, thin, the glans distinctly differentiated and many times shorter than the corpus penis, drawn out apically into a narrow process ; ovipositor either annulate or altogether soft ; secondary sexual characters of ♂ sometimes few or absent, sometimes strongly developed in chelicerae, pedipalps, or legs ; no or slight metamorphosis, seldom significant.

The suborder is divided into two Tribes which may be distinguished as follows :—

1. Pedipalp tarsus shorter than pedipalp tibia, with none or a very small terminal claw ; maxillary lobes of coxa II very small, immovable or absent ; accessory stigmae not present on the legs Tribe *Dyspnoi*, p. 469.

Pedipalp tarsus longer than pedipalp tibia and always provided with a distinct terminal claw (simple or serrated) ; maxillary lobes of coxa II distinct, long and slender, movable ; 2 accessory stigmae on the tibiae of legs I-IV

Tribe *Eupnoi*, p. 472.

TRIBE DYSPNOI Hansen and Sorensen.

1904. Dyspnoi Hansen and Sorensen, Two Orders of Arachnida, p. 81.

1923. Dyspnoi Roewer, Die Weberknechte der Erde, p. 633.

Cutting edge of fingers of chelicerae at least partly armed with small pale sharply triangular teeth; tarsus of pedipalp shorter than tibia; terminal claw of tarsus of pedipalp rudimentary or absent. Maxillary lobe of coxa I: the chitinous portion nearest to the coxa very short, the chitinous portion lying farthest from the coxa much broader than long; maxillary lobe of coxa II either small, short, and almost immovable, or absent; labium fused with the maxillary lobes of coxa I up to well past the middle or to its apex. Stigmae of stigma-bearing sternite bridged over with granules; accessory stigmae on the legs absent; arculi genitales hidden except for a free plate in front of the genital operculum; genital aperture small and opening far in front of the transverse groove dividing the II and III sternites; ovipositor short, not annulate, its apex small.

Four families of which two, the *Trogulidae* and *Nemastomatidae*, occur in North Africa, and one, the *Acropsopilionidae*, is found in South Africa.

FAM. **ACROPSOPILIONIDAE** Roewer.

1923. Roewer, Die Weberknechte der Erde, p. 678.

Both thoracic tergites free and as in all the tergites not fused into a scute; a common tubercle for both eyes absent; carapace on each side raised and projecting anteriorly, covering the chelicerae, depressed in the middle, the lateral corners projecting angularly and each bearing at the side 1 large (faceted ??) eye; sternites I and II fused (sternite III—according to Silvestri's fig.—free ?), but sternite II without a distinct genital operculum (Silvestri's fig.) and on each side with 1 stigma; sternites IV–VII free; corona analis present ?; arculi genitales, sternum, labium ?; maxillary lobe of coxa I large (movable ?), that of coxa II small (immovable ?), that of coxa III vestigial, that of coxa IV absent; cutting edge of finger of chelicerae provided with small fine teeth; tarsus of pedipalp much smaller than tibia, with 1 minute terminal claw; legs long and slender, metatarsi I–IV without (?) calcaneus, tarsi I–IV each with 1 simple claw; penis long; metamorphosis ?.

This family was based on 1 genus and 1 species, *Acropsopilio chilensis*,

described by Silvestri in Redia, ii, p. 254 from Pitrufulquen, Chile, and a synopsis of his description with 3 figures is given by Roewer in Die Weberknechte der Erde, p. 678.

One genus is found in South Africa.

Gen. OONOPSOPILIO n. gen.

The eyes large, simple, not situated on a common tubercle but each eye placed at the side of a large tubercle projecting forwards at each antero-lateral corner of carapace and reaching beyond the anterior margin of carapace, their bases meeting in the middle line (figs. 66, *a, c*); both thoracic tergites fused; tergites of abdomen fused except the last; sternites fused except the last 1 or 2 which are free, the fused sternites clearly demarcated by grooves which, however, do not reach the sides; pedipalp femur with blunt papillae not ending in a single spine, but provided apically with a number of setae; legs long and slender, femora I-IV with a false joint near their bases; tarsal joints varying from 14-21; terminal section of tarsi consisting of 1 or 2 joints.

Oonopsopilio africanus n. sp.

(Text-fig. 66, *a-e*.)

Colour, 1 specimen (type) from Ladismith. Body above mottled brown, white, and black, ocular tubercles seen from the side with a broad black ring round the eyes so that the whole tubercle appears black except for a narrow marginal yellow band anteriorly and posteriorly; below sternites whitish, coxae whitish mottled with brown, genital operculum infuscated dark brown at its periphery; pedipalp with femur at its base above, patella, tibia, and tarsus infuscated blackish; legs with white and brown annulations, tarsal segments blackish.

In the one specimen from the Addo Bush the colouring seen from above is an almost uniform brown with a broad median longitudinal band bordered by a sinuous brown stripe a little darker than the colour of the sides but hardly distinguishable from them; seen from the sides, the lateral margin of the carapace extending from the third coxa anteriorly is white with a narrow black band above it; under surface of body a uniform dirty white not mottled. The other specimen from the Addo Bush is similarly coloured except that the median band and eye tubercles above are silvery white mottled with a few darker spots; the median band is bordered on each side by a fine sinuous

black line and contrasts strongly with the brown sides; most of the specimens from Cape Town have this type of colouring.

Eyes placed on tubercles which are bluntly pointed anteriorly; these tubercles project forwards and meet in the middle line, their anterior inner surfaces being opposed to each other, forming an incision which is almost a right angle; seen from the side, the tubercles are egg shaped, the narrow end of the egg facing posteriorly (fig. 66, *a*); the eyes simple and large, occupying nearly a third of the length of tubercle; when the animal becomes a little dry, shrinkage of the large surface of the eye gives it a superficial resemblance to a faceted eye, and this is probably what has caused Silvestri to figure the eye of

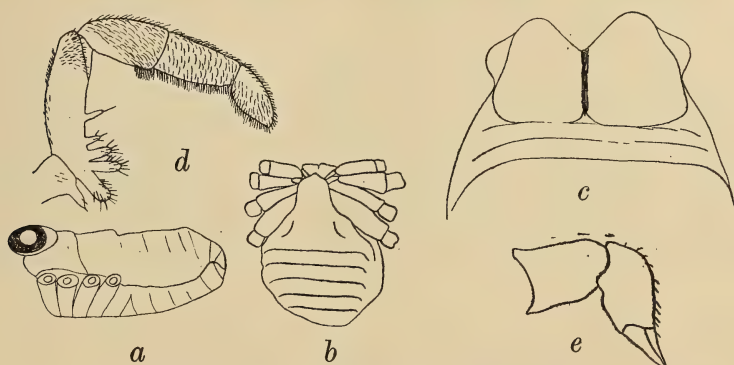


FIG. 66.—*Oonopsopilio africanus*. *a*, body from the side; *b*, ventral surface of body; *c*, anterior portion of body from above; *d*, palp; *e*, chelicera.

Acropsopilio as “*genetzt*.” The skin of body smooth and without armature; it is much wrinkled and displaced in spirit specimens and it is therefore difficult to describe the segmentation with certainty, which seems to be as follows: thoracic tergites fused, abdominal tergites except the last fused, though distinguishable from each other by grooves which are more easily seen at the sides of the body; sternites except the last 1–2 fused, separated from each other by distinct grooves which end before reaching the sides of the body; only the maxillary lobes of coxae I and II visible, these small (fig. 66, *b*); genital operculum as in fig. 66, *b*. Pedipalp as in fig. 66, *d*, seen from the inner side, femur with a brush of black hairs above near apex, an apical patch of black hair on inner side; patella, tibia, and tarsus well covered with uniformly disposed black hairs; chelicera as in fig. 66, *e*. Legs: femora, patellae, and tibiae with 2 rows of small black spines at the sides, 1 ventral row and 1 dorsal

row, the spines of these rows well separated from each other; metatarsi with a brush of short fine black hairs along its ventral surface, all tarsal segments with similar hairs along their ventral surfaces; tarsal segments 14-22.

Type, 1 specimen from Ladismith, Cape Province.

Other specimens: 1 from Worcester Mountains (5000 feet altitude); 2 from Addo Bush; 6, Table Mountain (in grass); 1, Simonstown; 1, Plumstead, Cape Peninsula; 4, Caledon; 7 (3 ♂♂), Signal Hill, Cape Town; only those in which the penis is actually protruding are reckoned as males. All these are fully adult specimens as those in which the penis is visible differ in no way from those where it is not; the penis itself in proportion to the size of the animal is very long and stout. The differences of colour may be either due to the age or sex of the animals; there is also some variation in the papillae found on the ventral surface of pedipalp femur which are sometimes longer and more slender than as shown in fig. 66, *d*, or the two basal papillae are replaced by one which is bifurcate at the tip. These variations occur in 2 specimens from Ashton, C.P.; 3 (1 ♂) from St Helena Bay, C.P. In one specimen from Caledon with all the legs intact the tarsal segments are I, 14-15; II, 17-18; III, 15; IV, 17-19.

TRIBE EUPNOI Hansen and Sorensen.

1904. Eupnoi Hansen and Sorensen; Two Orders of Arachnida, p. 80.

1923. Eupnoi Roewer, Die Weberknechte der Erde, p. 697.

Cutting edge of fingers of chelicerae armed only with strong (blackish) teeth; tarsus of pedipalp distinctly longer than tibia; terminal claw of tarsus of pedipalp always distinct, simple or serrate; maxillary lobe of coxa I: the two chitinous portions about equal in length, maxillary lobe of coxa II distinct, long and movable; labium fused with the maxillary lobe of coxa I to about its middle; sternum transversely almost entirely covered by the anterior free plate of the arculi genitales; stigmata exposed; 2 accessory stigmata on each of the I-IV tibiae (these stigmata not exposed in juveniles); arculi genitales visible close to the genital operculum and forming in front of the genital operculum a free anteriorly projecting plate; genital opening very large and not commencing far in front of the transverse groove which divides the II and III sternites; ovipositor long, annulate in its entire length, the annulations beset with setae, its apex deeply cleft by the first 3 annulations.

A single family, the *Phalangiidae*, cosmopolitan in distribution, is redivided into 7 subfamilies; of these 6 occur in Africa but only 2, the *Phalangiinae* and *Neopilioninae*, have representatives in the South African region.

Key to subfamilies.

1. Tarsus of pedipalp with a distinct terminal claw, cutting edge of claws of chelicerae with irregularly disposed small and large teeth (fig. 68, *d*)

Phalangiinae, p. 475.

- Tarsus of pedipalp with terminal claw absent or minute, cutting edge of claws of chelicerae with small equal-sized teeth (fig. 67, *f*)

Neopilioninae, p. 473.

SUBFAM. **Neopilioninae** n. subfam.

Thoracic tergites defined by distinct grooves, abdominal tergites not distinctly defined; corona analis absent; openings of odoriferous glands at sides of carapace visible from above; coxae without anterior or posterior rows of granules; maxillary lobes of coxa II not directed towards each other at an angle but forming a more or less straight line at right angles to the longitudinal axis of the body (fig. 67, *c*), chelicerae small, segment I without a ventral process and unarmed; cutting edge of claws of segment II with teeth of uniform size (fig. 67, *f*); pedipalp unarmed, tibia and patella at least densely clothed with hairs (fig. 67, *d*); tarsus with very minute terminal claw,* simple and not serrated; legs unarmed; secondary sexual characters of ♂ absent; metamorphosis slight.

One genus in South Africa.

Gen. **NEOPILIO** n. gen.

Body size small; skin of body soft and unarmed, ocular tubercle unarmed; abdominal tergites defined by indistinct grooves, thoracic tergites by distinct grooves, last two sternites more distinctly defined than the remainder; coxae smooth; pedipalp not armed with spines or teeth, terminal claw of tarsus minute, tarsus much longer than tibia, patella and tibia thickly covered with hairs (fig. 67, *d*); chelicerae unarmed, much smaller than body, claws of segment II with numerous small more or less equal-sized teeth (fig. 67, *f*); legs without teeth

* In some specimens this claw cannot be seen at all, in specimens where it is present it is only visible under low power of the microscope.

or spines, femora without nodules or pseudo-articulations; secondary sexual characters not present in ♂.

One species, Western Cape Province.

Neopilio australis n. sp.

(Text-fig. 67, a-g.)

Colour.—Body as in fig. 67, b, ventral surface, chelicerae, pedipalps, and legs pale yellow.

Anterior margin of carapace smooth, ocular tubercle low rounded and smooth or with a few minute spicules above; abdominal and

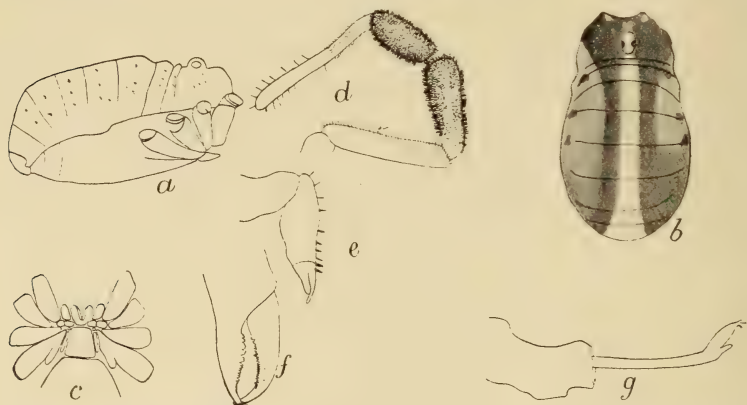


FIG. 67.—*Neopilio australis*. . a, body from the side; b, from above; c, ventral surface (somewhat schematic); d, palp; e, chelicera; f, claws of chelicera; g, penis.

thoracic tergites with a few minute almost invisible spicules, otherwise quite smooth; coxae and sternites smooth, the former with a few setae. Pedipalp as in fig. 67, d; terminal claw of tarsus minute, simple and not serrate; femur with colourless short hairs, more so on its ventral surface, patella and tibia with a fairly dense brush-like covering of these hairs, tarsus with a band of hairs near its base, these not as dense as those of patella and tibia; pedipalp otherwise entirely smooth; chelicera small, entirely smooth (fig. 67, e), segment II with a few setae, claws of segment II with small equal-sized teeth (fig. 67, f), those of the immovable claw bifid or trifid in proximal half, conical in distal half. Legs entirely without teeth, femora and tibiae with short setose spines, metatarsi and tarsi with fine minute hairs; tarsal segments I, 30; II, 57; III, 28–30; IV, 33.

Secondary sexual characters seem to be absent in the ♂ which is in all respects similar to other specimens ; penis seen from the side as in fig. 67, *g* (specimen from Simonstown).

Measurements of largest of types.—Length of body 5.5, pedipalp 5.4, chelicera I+II, 1+1.6 mm.

Types, 17 specimens from Signal Hill, Cape Town. Most of the remaining specimens, 49 in number, are from the same locality. Other localities : Simonstown (6), Newlands (2), Caledon (3), Hout Bay, Cape Peninsula (1), St James, Cape Peninsula (3), Touws River (1).

SUBFAM. **Phalangiinae** Simon.

1923. Roewer, *Die Weberknechte der Erde*, p. 746.

Both thoracic tergites and abdominal tergites I–VIII together with the operculum anale clearly demarcated by transverse grooves, the I–V abdominal tergites very seldom fused into a scute ; corona analis absent ; openings of the odoriferous glands at the sides of the carapace and clearly visible from above ; coxae I–IV without a posterior and anterior row of granules ; maxillary lobes of coxa II long and slender, forming with each other a blunt angle at the anterior margin of the genital operculum, the sides of the angle directed backwards. Chelicera : segment I below always without 1 forwardly directed spine, unarmed ; cutting edge of fingers with large and small teeth ; pedipalp : maxilla provided with 2 granules ; terminal claw of tarsus always distinct, simple and not serrate ; legs long, femora I–IV always without nodules ; penis (*in situ*) with backwardly directed apex ; secondary sexual characters abundant and often strongly developed in chelicera, pedipalp or legs ; metamorphosis slight, the forms in which the males show the most outstanding secondary sexual characters do not possess them in the younger stages.

The subfamily has a world-wide distribution and is a large one, containing 31 genera, of which 14 occur in Africa but only 1, *Rhampsinitus*, is found in the South African region.

Gen. **RHAMPSINITUS** Simon.

1879. Simon, *Ann. Soc. Ent. Belg.*, xxii, p. 72.

1923. Roewer, *Die Weberknechte der Erde*, p. 784.

Ocular tubercle normal, about as high as wide, toothed on each side above, distant from the anterior margin of carapace $1\frac{1}{2}$ –2 its long diameter ; surface of carapace in front of ocular tubercle usually

toothed; abdomen above without large spines (these seldom larger than the spines on the ocular tubercle, generally much smaller); lamellae smooth; chelicera in ♀ small and normal, in the ♂ with strong secondary sexual characterisation; segment I shortly cylindrical, much drawn out, directed obliquely upwards far beyond the anterior margin of the carapace; segment II similar to segment I in appearance and length, not broader than segment I and almost cylindrical; both fingers of chelicera relatively quite short and stout, their length only $\frac{1}{4}$ – $\frac{1}{3}$ that of segment II (fig. 68, c); pedipalp in ♀ normally constructed, in ♂ usually much elongated and then very slender, patella apically and medially sometimes with an apophysis; legs long and slender, in the ♀ all 4 legs normal, in the ♂ leg I with secondary sexual characters more or less developed; femur-tibia I more or less incrassate or quite differently armed apically; secondary sexual characters developed in chelicera, also often in pedipalp and leg I.

Distribution.—Africa from the Sahara southwards to the Cape; 29 species, of which 19 are found in South Africa.

Key to species, ♂♂.

1. Dorsum of abdomen thickly and irregularly covered with spines . . . 2.
Tergites of abdomen each with 1 or 0 transverse rows of small spines . . . 8.
2. Spines on dorsum of body with accessory spicules at their sides (fig. 75, e)
cristatus, p. 489.
Spines on dorsum of body without accessory spicules . . . 3.
3. Sternites and genital operculum thickly covered with granules *capensis*, p. 478.
Sternites and genital operculum smooth . . . 4.
4. All coxae granular below . . . 5.
All coxae smooth or coxa I with a few granules . . . 7.
5. Chelicerae longer than pedipalps, ocular tubercle above with 4 pairs of spines
lalandei, p. 494.
Chelicerae shorter than pedipalps, ocular tubercle above with 3 pairs of spines 6.
6. Anterior margin of carapace with an enlarged median spine projecting forwards beyond its edge, area between this spine and ocular tubercle smooth in the middle . . . *hispidus*, p. 499.
Anterior margin of carapace and the area between it and ocular tubercle uniformly and thickly spined . . . *echinodorsum*, p. 500.
7. Pedipalp spined, not longer than body length . . . *littoralis*, p. 480.
Pedipalp smooth, very long, 4 times length of body . . . *longipalpis*, p. 483.
8. Tergites of abdomen smooth without a transverse row of small spines
levis, p. 487.
Tergites of abdomen each with 1 transverse row of spines . . . 9.
9. Pedipalps with femora and sometimes patellae sparsely granular . . . 10.
Pedipalps entirely smooth . . . 12.
10. Both segments of chelicerae entirely smooth . . . *minor*, p. 496.
Segment I of chelicera at least armed . . . 11.

11. Coxae I and II granular, ocular tubercle above with more than 3 pairs of spines
telifrons, p. 497.
All coxae smooth, ocular tubercle above with 3 pairs of spines *vittatus*, p. 482.
12. Pedipalps shorter than or equal to chelicerae 13.
Pedipalps longer than chelicerae. 15.
13. Carapace between its anterior margin and ocular tubercle thickly and irregularly
spined in the middle, ocular tubercle above with 4 pairs of small spines
granarius, p. 501.
Carapace between its anterior margin and ocular tubercle smooth in the middle,
ocular tubercle above with 3 pairs of long spines 14.
14. Segment I of chelicera below on outer side with a row of enlarged curved
teeth besides smaller granules (fig. 77) *transvaalicus*, p. 493.
Segment I of chelicera below without enlarged teeth, all teeth small and more
or less equal sized (fig. 82) *leighi*, p. 497.
15. Legs long and slender, leg II 10 or more times body length 16.
Legs shorter, leg II 4-7 times body length 17.
16. Legs almost smooth, spines of femora very minute, femur I below without
enlarged spines at inner apex *silvaticus*, p. 491.
Femora of legs with distinct rows of spines, femur I below with 2-3 enlarged
spines at inner apex *unicolor*, p. 485.
17. Femur I below with 3-4 enlarged tooth-like spines at inner apex
flavidus, p. 486.
Femur I below with no enlarged spines at inner apex 18.
18. Carapace between anterior margin and ocular tubercle with about 20 equal-
sized spines *crassus*, p. 495.
Carapace between anterior margin and ocular tubercle with about 10 spines,
1 median spine on anterior margin of carapace larger than the rest
spenceri, p. 498.

Key to species, ♀♀.

1. Dorsum of abdomen thickly and irregularly covered with spines 2.
Tergites of abdomen each with 1 or 0 transverse rows of small spines . . . 7.
2. Spines on dorsum of body with accessory spicules at their sides (fig. 75, e)
cristatus, p. 491.
Spines on dorsum of body without accessory spicules 3.
3. Sternites and genital operculum thickly covered with granules *capensis*, p. 480.
Sternites and genital operculum smooth 4.
4. All coxae granular below 5.
All coxae smooth or coxa I with a few granules 6.
5. Anterior margin of carapace with a median spine larger than the others on
the carapace projecting forwards beyond its edge, ocular tubercle above
with 3 pairs of spines *hispidus*, p. 499.
Anterior margin of carapace without an enlarged median spine, spines on
carapace uniform in size, ocular tubercle above with 4 pairs of spines
lalandei, p. 494

6. Anterior margin of carapace in the middle with 3 stout spines, segment I of chelicera granular above, legs short, leg II 5 times body length
littoralis, p. 482.
- Anterior margin of carapace almost smooth, segment I of chelicera smooth, legs long, leg II 10 times body length . . . *longipalpis*, p. 485.
7. Tergites of abdomen smooth without a transverse row of small spines
levis, p. 489.
- Tergites of abdomen each with I transverse row of spines . . . 8.
8. Carapace between anterior margin and ocular tubercle smooth or with 1-2 weak spines . . . 9.
- Carapace between anterior margin and ocular tubercle with 10-20 strong spines . . . 12.
9. Dorsum of body with a diamond-shaped black marking (fig. 76, *b*), legs with alternating light and dark bands . . . *silvaticus*, p. 491.
- Dorsum of body and legs uniform in colouring . . . 10.
10. Segment I of chelicerae more or less granular above . . . *leighi*, p. 497.
- Segment I of chelicerae smooth . . . 11.
11. Pedipalps smooth . . . *transvaalicus*, p. 494.
- Pedipalps with femur sparsely granular below . . . *minor*, p. 496.
12. Carapace between anterior margin and ocular tubercle with about 20 equal-sized spines . . . *crassus*, p. 495.
- 1 median spine on anterior margin of carapace larger than the rest, carapace between anterior margin and ocular tubercle with about 10 spines
spenceri, p. 498.

The following species of *Rhampsinitus* are not included in the above keys as not occurring in the South African region: *R. ater*, *quadrispina spinifrons*, *filipes*, *lettowi*, *pictus*, *montanus*, *niger*, *bettoni*, from East Africa; *pachylomerus* from Abyssinia. Descriptions and figures of these are given by Roewer in *Die Weberknechte der Erde*, pp. 784-795.

Rhampsinitus capensis n. sp.

(Text-fig. 68, *a-e*.)

♂. *Colour*.—Dorsal surface of body a light earthy brown, a median strip and the area on each side of the ocular tubercle a little darker; all spines tipped with black, a V-shaped marking at anterior margin of carapace in front of ocular tubercle blackish; ventral surface of body dirty white, sternites with 2 indistinct longitudinal brown stripes in the middle, coxae with their distal $\frac{2}{3}$ and some spots at their bases brown, chelicerae a rich brown, segment I lighter above and blackish below, segment II blackish below, its anterior outer surface with some dark brown spots, palp and legs dark brown; body covered with long

black-tipped spines except on the grooves dividing the tergites, the spines in the middle of the body long, longer than those on the ocular tubercle, those at the sides of the body generally shorter than those on the ocular tubercle, last 2 tergites with short spines, operculum anale with none; anterior margin of carapace in the middle with 3 stout spines directed forwards and upwards, the middle one stouter than the 2 lateral ones which are directed a little more upwards than the middle one; behind each of these a row of 2-3 shorter spines; another spine on the anterior margin of carapace a little shorter than the lateral spines and situated laterally to them (thus 5 spines on the anterior margin of carapace); antero-lateral angles of carapace with



FIG. 68.—*Rhampsinitus capensis*. ♂: *a*, ocular tubercle; *b*, chelicera from inner; *c*, from outer side; *d*, claws of chelicera enlarged; *e*, palp.

a group of small spines, 1 or 2 at the sides of the ocular tubercle; ocular tubercle as in fig. 68, *a*, the number of spines varying considerably, usually a large one alternating with a small one; behind ocular tubercle a transverse row of spines extending across carapace; coxae, genital operculum, and sternites all uniformly and thickly (especially coxae) covered with black-tipped granules.

Chelicerae as in fig. 68, *b*, seen from inner side (fig. 68, *c*, seen from outer side); segment I below with 5-6 large triangular teeth on the outer side, on inner side with some granules near the base, otherwise ventral and inner surface smooth; whole of upper surface with strong coarse spines varying considerably in size; segment II flattened on inner side, rounded on outer side, basal third of its anterior surface with small sharp granules. Pedipalp as in fig. 68, *e*. Legs: femur, patella, and tibia of leg I stouter than those of other legs with 5 distinct rows of spines; upper surface with 3 rows, a middle and 2 lateral rows, ventral surface with 1 row on each side; in addition an irregular row

of spines on each side between the dorso-lateral and ventro-lateral rows (these rows not present in leg II); the spines of the dorsal rows larger than those of the ventral rows in femur and patella, those of tibia more or less equal sized; femur I shortest, femur II longest of legs; tarsal segments I, 30; II, 64-67; III, 31-35; IV, 31-35.

Measurements.—Length of body 6.5, greatest width 4.5, chelicerae I+II, 2.1+3.8, pedipalps 5.7 mm.

♀. *Colouring* as in ♂. Spination; spines of dorsal surface of body smaller than in ♂, the larger ones in the middle of the body more distinctly demarcated from the smaller ones at the sides; coxae, genital operculum, and sternites granular as in ♂; chelicerae unarmed except for a few granules near upper apex of segment I; palp armed as in ♂ but less strongly so; legs more slender, the spines smaller than in the ♂. Tarsal segments 29:61:29:34.

Measurements.—Length of body 7.4, breadth 4.5, chelicerae 2.5, pedipalps 3.8 mm.

Types, 5 ♂♂, 2 ♀♀, Signal Hill, Cape Town. Other specimens: 4 ♂♂, 3 ♀♀, Signal Hill, Cape Town; 4 ♂♂, 10 ♀♀, Table Mountain; 1 ♂, 1 ♀, St Helena Bay; 2 ♀♀, Prince Albert Division; 1 ♀, Gordon's Bay; 3 ♀♀, Kalk Bay.

Rhampsinitus littoralis n. sp.*

(Text-fig. 69, a-d.)

♂. *Colour*.—Dorsum of body at the sides blackish brown mottled with greyish spots, a darker longitudinal band in the middle expanding on the thoracic segments and including ocular tubercle and most of the carapace; spines bordering the sides of the median darker band white, those situated on the band itself and at the sides of the body greyish brown; the middle of the three spines on the anterior margin of carapace white, the lateral ones brown; ventral surface of body dirty white, 2 indistinct longitudinal brown stripes on the sternites extending along the sides of the genital operculum, distal $\frac{2}{3}$ of coxae brown, some brown spots at their bases; chelicerae a rich brown, segment II lighter, the inner and outer sides except at apex speckled with small black spots; pedipalp with tarsus and apical third of tibia yellow, remainder dark brown; legs light brown, tibiae, especially apically, a little darker, tibiae and patellae, especially of posterior legs, speckled with small black spots above; colouring in general of the same type as in *capensis*.

* In all probability *Phalangium rhinoceros* Strand, based on a ♀ from Simons-town, Cape Province, is identical with this species.

Tergites with rather irregular single rows of spines consisting of larger ones confined to the darker area in the middle (these a little larger than the spines on the ocular tubercle), and smaller spines at the sides of the body (these distinctly smaller than the spines on the ocular tubercle); in addition to these there are small scattered spines between the transverse rows of spines on the tergites; tergites VI and VII with small spines only, VIII and anal operculum with none; thoracic segments with a complete transverse row of small spines; anterior margin of carapace in the middle with 3 stout spines directed more forwards than upwards, the middle one considerably stouter than the lateral ones, its axis in the same plane or a little lower than these; area between these spines and ocular tubercle smooth, devoid of spines; 3-4 small spines at antero-lateral angles of carapace, carapace generally with much fewer spines than in *R. capensis*; ocular tubercle with 4 short stout spines, these constant in number not alternating with smaller spines, an incomplete transverse row of small spines behind ocular tubercle (fig. 69, *a*); coxa I with a few granules, remaining coxae, genital, operculum, and sternites without granules. Chelicerae (fig. 69, *d*) seen from outer side (fig. 69, *c*, seen from inner side), resembling those of *R. capensis*; segment I below on outer side with an irregular double row of about 9 teeth (in *R. capensis* a single row of 5-6), on inner side a double row of spine-like granules in proximal $\frac{2}{3}$ of segment; segment II with a few granules basally on its anterior surface; pedipalp spined as in fig. 69, *b*, tibia smooth except for 1 or 2 spines proximally. Legs spined as in *R. capensis*, differing in the tibiae, on which, except for 2 inferior rows, the spines are barely perceptible; tarsal segments 35:62:33:38-40.

Measurements.—Length of body 7, breadth 4, chelicerae I+II, 2.5+4, pedipalps 6 mm.



FIG. 69.—*Rhapsinitus littoralis*. ♂: *a*, ocular tubercle; *b*, palp; *c*, chelicera from inside; *d*, chelicera from outside.

♀. *Colour* and spination of body as in ♂; palp with weaker spination than in ♂, femur dorsally smooth, tibia with 1 or 2 minute spines; chelicerae with some granules above on segment I, segment II smooth.

Measurements.—Length of body 6, breadth 4·3, chelicerae I+II, 3, pedipalp 4·4; leg II, 28 mm.

Types, 2 ♂♂, 4 ♀♀, Hermanus, Cape Province (collected R. Lightfoot, 1902). Other specimens: 18 ♂♂, 52 ♀♀, Hermanus (collected C. de Villiers and R. F. Lawrence, 1929). Other localities: St James, Bergvliet, Cape Flats, Plumstead, Kalk Bay, Maitland, Retreat, all Cape Peninsula. This species is allied to *R. capensis* in colouring and especially in the structure of the ♂ chelicerae; it can easily be distinguished from it by the fewer and smaller spines on the dorsum of body, the spines of the ocular tubercle, and the absence of granulation on the inferior surface of the body. Both species, it will be noted, occur in the Cape Peninsula; *capensis* is in all probability a monticolous form, while *littoralis*, which has not been recorded from mountains, lives in flat, low-lying, sandy regions.

Rhampsinitus vittatus n. sp.

(Text-fig. 70, a-e.)

Colour.—Dorsum of body with a light brown longitudinal band in the middle widening on the thoracic segments and forming a diamond-shaped patch on carapace; a sinuous white band on each side of median band reaching from posterior end of abdomen to anterior margin of carapace, on the whole a little narrower than the median band; laterally to these white bands the sides of the body from posterior end of abdomen to thoracic tergites brown, a little darker than the median band; sternites and genital operculum white, coxae light brown, mottled with white spots proximally; chelicerae with segment I blackish brown below, yellowish brown above, segment II light brown below, yellowish brown above, mottled with brown spots; pedipalp and legs light brown to yellow. Tergites each with a single transverse row of minute spines, those bordering the sides of the median band slightly larger; anterior margin of carapace (fig. 70, a) with no large spines projecting forwards beyond its edge, area between anterior margin of carapace and ocular tubercle smooth in the middle, 2 minute spines at the sides; antero-lateral angle of carapace with a group of 4-5 small spines, 1 small spine laterally to eye tubercle; ocular tubercle (fig. 70, a) with 3 moderate spines above; all coxae,

genital operculum, and sternites smooth; chelicerae as in fig. 70, *b*, seen from inner side (fig. 70, *c*, seen from outer side); segment I below (fig. 70, *d*) with a broad irregular strip of granules on each side, those of the outer side larger than those of the inner side, the strip tapering distally on both sides, a narrow area between them smooth; whole of dorsal surface except near the base granular; segment II with some weak granules basally on its anterior surface in the middle; pedipalp with femur (fig. 70, *e*) fairly densely covered with granules inferiorly, femur above, patella and tibia with a few weak granules, tarsus smooth. Legs: femora with the usual 5 rows of spine-like granules, 3 above and 2 below, femur I with a sixth accessory row in proximal



FIG. 70.—*Rhampsinitus vittatus*. ♂; *a*, ocular tubercle; *b*, chelicera from under side; *c*, chelicera from outer side; *d*, segment I of chelicera below; *e*, palp.

half between the dorso-lateral and infero-lateral rows only on the outer side; patellae with a few rows of minute spines, tibiae quite smooth except for 2 inferior rows of minute spines in I; tarsal segments 42 : 73 : 43 : 47.

Measurements.—Length of body 5·5, breadth 3·7, pedipalps 6·2, chelicerae I+II, 2·2+3·7 mm.

Types, 2 ♂♂, Sir Lowry's Pass, Hottentots Holland Mountains, Caledon, Cape Province. This species is related to *capensis* and *littoralis*.

Rhampsinitus longipalpis n. sp.

(Text-fig. 71, *a-b*.)

♂. *Colour*.—Dorsum of body uniform dark brown, the spines black, ocular tubercle and sides of carapace light brown; ventral surface dirty white, coxae light brown with some ivory white stripes in the

middle ; chelicerae light brown, a little darker near the base of segment I, pedipalp yellowish brown, legs blackish brown. lighter distally.

Tergites of abdomen (fig. 71, *a*) irregularly and fairly densely covered with triangular spines, the longest of these a little shorter than those on the ocular tubercle, not arranged in transverse rows and with no indication of grooves dividing the tergites ; the spines in the middle a little larger than those of the sides ; carapace with scattered spines fewer and smaller than those on the tergites, 1 larger

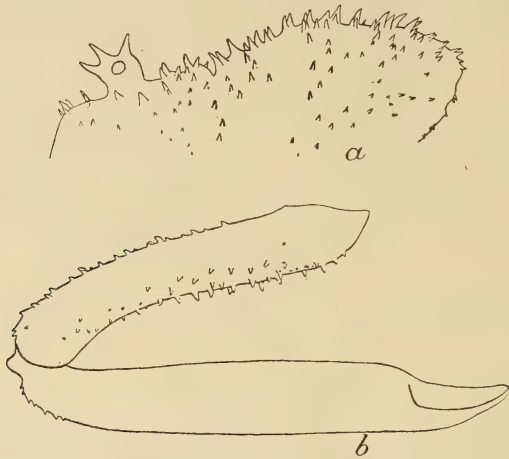


FIG. 71.—*Rhapsinitus longipalpis*. ♂: *a*, body from the side ; *b*, chelicera from inner side.

spine at the side of ocular tubercle opposite the eye ; anterior margin of carapace in front of ocular tubercle with 3 small spines, the middle one smaller than the lateral ones, behind each of the latter 1 small spine situated more mesially ; antero-lateral angles of carapace with a group of 4-5 small spines ; coxa I below with a few small granules, remaining coxae with ventral surfaces smooth ; chelicerae as in fig. 71, *b*, seen from inner side, segment I with the spines of the upper surface more numerous than those of the under surface, the sides smooth ; segment II anteriorly at the base with some small spines, otherwise smooth ; pedipalp much longer than body or chelicerae, about 4 times the length of body and 2 times the length of chelicerae, femur below with a few minute granules tipped with short setae, otherwise quite smooth. Legs very long, especially II, which is nearly 12 times length of body ; femora with the usual 5 rows of

short spines, no accessory rows present, tibiae smooth except in I, which has 2 inferior rows of minute granules, patellae with some irregular rows of minute spicules; femur II the longest, III the shortest, thus: II, IV, I, III; tarsal segments 47:86:44:48-50.

Measurements.—Length of body 6.3, breadth 4.6, chelicerae I+II = 5.7 + 7.4, pedipalp (femur + pat. tibia + tarsus) = 10 + 9 + 7.2 = 26.2 mm.

♀. *Colour*.—Abdomen above with a black marking in the middle, pointed at the sides in tergite II, then slightly constricted and parallel sided in remaining tergites, this marking not continued anteriorly on thoracic tergites; sides of abdomen light brown, carapace light brown variegated with black spots and stripes, otherwise as in ♂; spination in general as in ♂, thoracic segments with an irregular transverse row of spines, a similar row behind ocular tubercle; anterior margin of carapace with 1 small spine in the middle; ocular tubercle above with 4 spines on the one side, 3 on the other; chelicerae much smaller than in ♂, smooth; pedipalps much smaller than in ♂, smooth except for some minute granules on ventral surface of femur and dorsal surface of patella; legs very long, especially II, spines of femora much smaller than in ♂, absent on remaining segments.

Measurements.—Length of body 7, breadth 4.3, chelicerae 3.6, palp 6.3; leg II, 72 mm.

Types, 4 ♂♂, 1 ♀, East London, Cape Province.

Rhampsinitus unicolor n. sp.

(Text-fig. 72, a-c.)

Colour a uniform rich deep brown, femora of legs a little darker. Abdomen with a single transverse row of minute spines in each tergite somewhat irregular and interrupted; thoracic tergite I with a transverse row of small spines only in the middle, thoracic tergite II with a complete transverse row of small spines, both these rows regular and not interrupted; anterior margin of carapace with a minute spine in the middle, 2 spines a little farther back at each side, a few scattered spines on carapace at the sides of ocular tubercle; ocular tubercle with 3 spines above on each side, 1 small spine anteriorly at its base (fig. 72, b); inferior surfaces of coxae I and II with a few minute granules, those of II barely perceptible, remaining coxae, sternites, and genital operculum smooth; chelicerae (fig. 72, a): inferior surface

of segment I with an irregular interrupted row of spines on each side, smooth in the middle; dorsal surface sparsely but uniformly covered

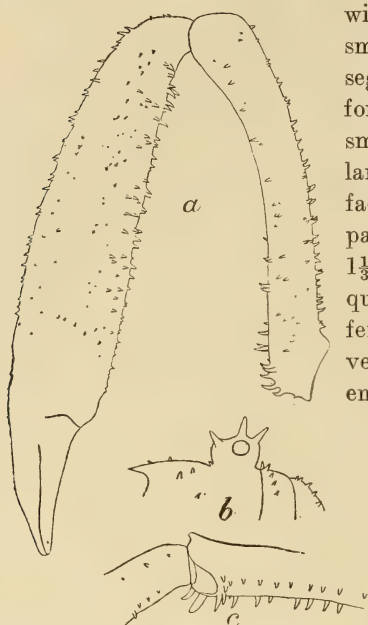


FIG. 72.—*Rhampsinitus unicolor*. *a*, chelicera; *b*, ocular tubercle; *c*, apex of femur of leg I.

with small spines, these distinctly smaller than those of ventral surface; segment II with dorsal surface uniformly but sparsely covered with small spines, those situated proximally larger than the distal ones, ventral surface similar, the sides smooth; pedipalp long, 3–4 times as long as body, $1\frac{1}{2}$ as long as chelicerae, very slender, quite smooth. Legs long and slender, femora with the usual 5 rows of spines, ventral surface of femur I with 2–3 enlarged spines at its inner apex (fig. 72, *c*); patella I with 5 rows of minute spines, tibia I with 2 inferior rows, remaining patellae and tibiae smooth; tarsal segments 44 : 67 : 43 : 48.

Measurements.—Length of body 6.3, breadth 4.2, chelicerae I+II, 7+9, pedipalp (femur+pat. tibia + tarsus)=8.5+6+7.8=22.3; leg II, 72 mm.

Type, 1 ♂, Shiliowane, near Leydsdorp, Transvaal.

Rhampsinitus flavidus n. sp.

(Text-fig. 73, *a-d*.)

Colour.—Dorsal and ventral surfaces of body a uniform clay yellow with a few black spots, all spines tipped with black; chelicerae light brown, segment I a little darker at its apex; pedipalp with whole of femur, except at distal and proximal apices and tarsus, black, remainder yellow; legs light brown, a little darker than body, tarsi blackish; this coloration may be due to prolonged immersion in alcohol; abdominal and thoracic tergites with regular transverse rows of small spines; carapace at sides of ocular tubercle with 1 fairly large spine opposite the eye; between anterior margin of carapace and ocular tubercle a group of 12–15 small spines not arranged in rows, anterior margin of carapace at the sides with a row of 4 small spines; ocular

tubercle as in fig. 73, *a*, with 4 spines above; coxae, sternites, genital operculum smooth. Chelicerae as in fig. 73, *b*, seen from outer side (fig. 73, *c*, seen from inner side); outer side of segment I with some fairly long curved spines at its base below, above with some shorter ones, outer side between the upper and lower spines smooth; whole of inner side with irregular sparse short spines; segment II smooth on the outer side, inner side with some minute black spicules at its base; pedipalps smooth. Legs: femur I with the usual 5 rows of spines,

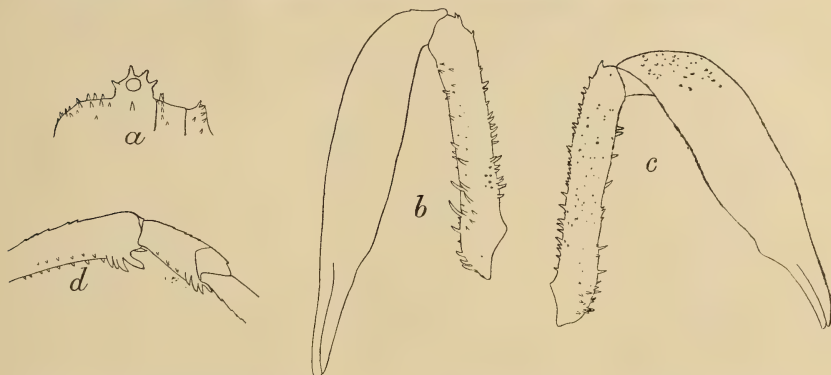


FIG. 73.—*Rhampsinitus flavidus*. ♂: *a*, ocular tubercle; *b*, chelicera from outer side; *c*, chelicera from inner side; *d*, femur-patella of leg I.

below at apex with some enlarged spines on inner side as in fig. 73, *d*, patella with 2 rows of spines below ending apically in 2-3 larger spines, smooth above; tibia with 2 rows of minute spines below (much smaller than those of femur and patella), quite smooth above; remaining femora spined but without enlarged apical spines, patellae and tibiae smooth; tarsal segments 39:68:38:46.

Measurements.—Length of body 4.6, breadth 3, chelicerae I+II, 4+5, pedipalp (femur+pat. tibia+tarsus)=4.3+3+4.3; leg II, 34 mm.

Type, 1 ♂, Makoetsi, near Leydsdorp, Transvaal. Type in Transvaal Museum.

Rhampsinitus levis n. sp.

(Text-fig. 74, *a-d*.)

♂. *Colour* almost uniform pale yellow, probably due to prolonged immersion in alcohol; abdomen with a median dark greyish coloured band almost parallel sided, the lateral borders crenulated; carapace coloured similarly to median abdominal band except dorsal surface

of ocular tubercle and a triangular marking just posterior to it which are pale yellow, carapace streaked with chocolate-brown stripes and spots; ventral surface of abdomen pale, coxae in proximal half ivory white, in distal half greyish; chelicerae with some brownish infuscation on their inner sides, segment II with some brown spots on inner side; pedipalp pale yellow; legs almost uniform pale yellow, tibiae and patellae infuscated brown; abdominal tergites

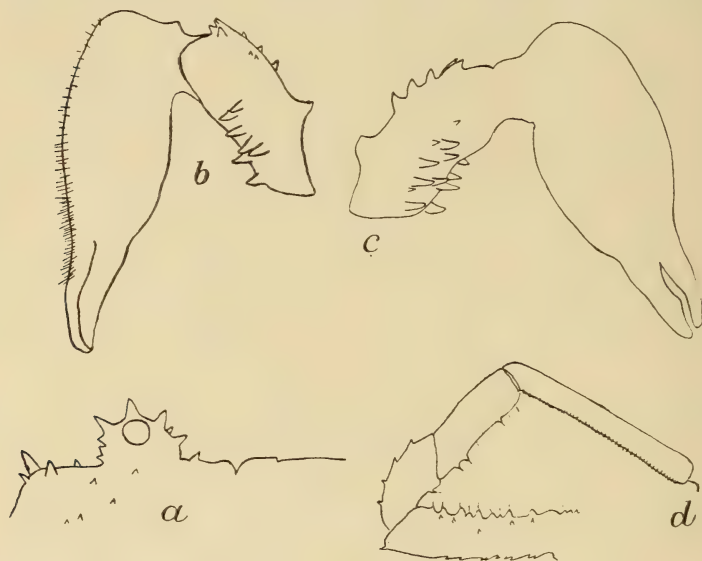


FIG. 74.—*Rhampsinitus levis*. ♂: *a*, ocular tubercle; *b*, chelicera from outer side; *c*, chelicera from inner side; *d*, palp.

entirely smooth without rows of granules, first thoracic tergite with a row of 2–4 short spines; anterior edge of carapace with 3 short blunt spines, the middle one considerably larger and stouter than the lateral ones, behind each of the lateral spines a larger spine, behind the middle spine on anterior margin of carapace and about half-way between this and ocular tubercle 2 small spines; antero-lateral angles of carapace with 1 small spine, a few small spines at the sides of the ocular tubercle; ocular tubercle as in fig. 74, *a*, with 4 pairs of short blunt spines and in addition a few spicules; distal edge of coxae above with 1 upwardly directed spine, inferior surfaces of coxae, sternites, and genital operculum entirely smooth. Chelicerae as in fig. 74, *c*, seen from inner side (fig. 74, *b*, seen from outer side); segment I with some spine-like granules in distal half above, below with some

slenderer spines on each side, those on the inner side more numerous, inferior surface between them smooth, sides smooth; segment II entirely smooth; pedipalp as in fig. 74, *d*, tarsus with under surface covered with fine minute spicules. Legs: femur I with 5 rows of small spines, patella with some rows of minute spines, tibia with none, femur with no enlarged spines below at inner apex; femora of remaining legs with smaller spines, the distal segments with none; tarsal segments 38 : 64 : 36 : 38.

Measurements.—Length of body 4·7, breadth 3, chelicerae I+II, 2+2·9, pedipalp 4·5 mm.

♀. *Colour* similar to ♂ but darker and more distinct, median band on dorsal surface of abdomen chocolate brown; chelicerae more or less infuscated, segment II more so than I; pedipalp with distal half of femur of pedipalp, patella, and proximal half of tibia infuscated brown; legs chocolate-brown, femora lighter below, tibiae with an apical and basal light band, the basal band narrower than the apical one, tarsi light; dorsum of body armed as in ♂, the lateral spines on the anterior edge of carapace not much smaller than the middle one; chelicerae with a few granules on the dorsal surface of segment I, none on inferior surface, segment II smooth; pedipalp less strongly armed than in ♂, femur with some granules below; femora of legs with weaker spines than in ♂; tarsal segments 36 : 63 : 33 : 40.

Measurements.—Length of body 6·1, breadth 3·3, chelicerae I+II, 2·9, pedipalp 4·3 mm.

In fresh female specimens the colour of body is in general a dark chocolate brown above, the median band darkest, the sides mottled, under surface dirty yellow.

Types, 1 ♂, 4 ♀♀, 3 juveniles, Kalk Bay, Cape Peninsula. Other localities: Simonstown; Newlands; Nordhoek; St. James; Grottoes, Table Mountain; Rosebank; Skeleton Gorge, Table Mountain, all Cape Peninsula.

Rhampsinitus cristatus n. sp.

(Text-fig. 75, *a-f*.)

♂. *Colour* of dorsum mottled grey brown, a broad median brown abdominal band with slightly crenulate sides, itself divided in the middle by a lighter longitudinal stripe; spines of dorsum white, tipped with black; sternites dirty white mottled with brown, coxae dirty white in proximal half, brown in distal half; chelicerae yellow with reddish-brown stripes, segment II with reddish-brown spots

anteriorly and at the sides; pedipalp whitish, femur and patella with some brown stripes; legs yellow, femora, patellae, and tibiae with some brown infuscated stripes. Body thickly covered with spines forming irregular transverse rows on the thoracic and abdominal tergites; these spines of two types, those in the middle large, their sides with a varying number of small black spicules (fig. 75, *e*), their tips bifid or trifid, the spines at the sides of the body consisting of low conical tubercles surrounded at their bases with a ring of small black

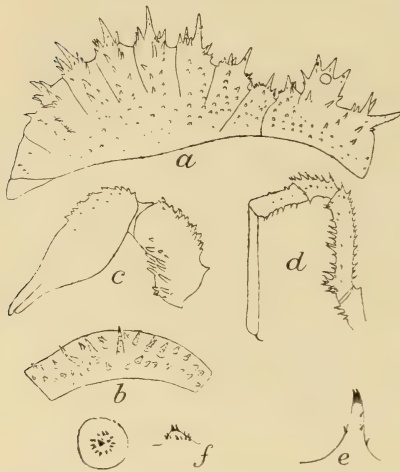


FIG. 75.—*Rhampsinitus cristatus*. ♂: *a*, body from the side; *b*, III abdominal tergite above; *c*, chelicera; *d*, palp; *e*, long median spine; *f*, short lateral spine from above and from the side.

spicules, these tubercles tipped at their apices with 1 or 2 spicules (fig. 75, *f*); the largest spines in the middle of the body larger than those on the dorsal surface of ocular tubercle, those at the sides of the body considerably smaller than the spines of the ocular tubercle; anterior margin of carapace in front of ocular tubercle with 3 enlarged spines, the median and largest projecting forwards and a little upwards, the 2 lateral ones pointing more directly upwards; carapace thickly covered with smaller spines (fig. 75, *a*); ocular tubercle above with 4 pairs of spines all with accessory spicules, the most posterior pair

the smallest; thoracic and abdominal tergites with 2 irregular rows of spines; 1 spine in the middle of each tergite distinctly enlarged, forming a median crest (fig. 75, *a*), this spine seen from above (fig. 75, *b*) placed between the 2 irregular rows of spines; sternites smooth, all coxae strongly granular; chelicerae spined as in fig. 75, *c*, segment I with a number of ventral spines on the outer side, those on the inner side similar but fewer in number; pedipalp spined as in fig. 75, *d*. Legs: femora provided with 5 rows of strong tooth-like black-tipped spines, those of the median dorsal row longer than the others, patellae spined, tibiae without spines but with 2 ventral rows of minute black spicules, leg I not incrassate; tarsal segments 35 : 69 : 33 : 39.

Measurements.—Length of body 5.6, breadth 3.7, pedipalp 5, chelicerae I+II, 1.7+3; leg I, 17 mm.

♀. Resembles ♂ in all respects except the following: the median brown band on dorsum of abdomen a little more distinctly defined; the chelicerae considerably smaller than in the ♂, segment I unspined below, above a few small teeth, segment II smooth; the pedipalp appears to be even more strongly spined than in the ♂.

Measurement of largest ♀ 7·8 mm. in length, chelicerae I+II, 1+2 mm.

Types, 3 ♂♂, 6 ♀♀, 4000 feet altitude, Great Winterhoek Mountains, Tulbagh, Cape Province.

Rhampsinitus silvaticus n. sp.

(Text-fig. 76, *a-b*.)

♂. *Colour*.—Dorsum blackish, sternites dirty white with some broken brown transverse stripes, coxae whitish, brown at their distal apices; segment I of chelicerae yellow brown, segment II speckled brown at the sides basally, a round black dot in the middle anteriorly; pedipalp whitish with black infuscation at the bases of the patella, tibia, and tarsus; legs uniform black; spines of dorsum of body and ocular tubercle yellow, tipped with black. Integument finely granular, abdominal and thoracic tergites each with a single transverse row of small spines (much smaller than those of the ocular tubercle); first thoracic segment with only 2 or 3 spines in the middle, transverse row of spines of first abdominal tergite interrupted in the middle, represented by 2 short oblique lateral rows of 2-3 spines a little larger than those of remaining tergites; ocular tubercle above with 3 short but sharp spines; no spines anterior to the ocular tubercle but 1 or 2 at the side near the lateral edge of the carapace; sternites and coxae entirely smooth; chelicerae short as in fig. 76, *a*, segment I spined above in distal $\frac{2}{3}$, outer ventral surface with enlarged and tooth-like spines forming an irregular row or rows, inner ventral surface with a few smaller spines; segment II anteriorly at its base with a few spicules, otherwise smooth; pedipalp as in fig. 76, *a*, the femur with a few small tubercles ventrally, tipped with short black setae, femur subequal to patella+tibia but shorter than tarsus. Legs long, smooth, and slender, the spines of femora so minute as to be invisible to the naked eye, only femur I perceptibly spined, remaining segments smooth, leg I not incrassate, leg II more than 10 times length of body.

Measurements.—Length of body 5·5, chelicerae I+II, 1·3+2·7, pedipalp 5·8; leg II, 63 mm.

♀. *Colour* differing markedly from that of ♂; dorsum dirty white,

the sides brown with a number of white spots each with a central black dot; a median marking as in fig. 76, *b*, which is black and strongly contrasting with the remainder of the dorsum, behind and laterally to the ocular tubercle a roughly triangular marking a little

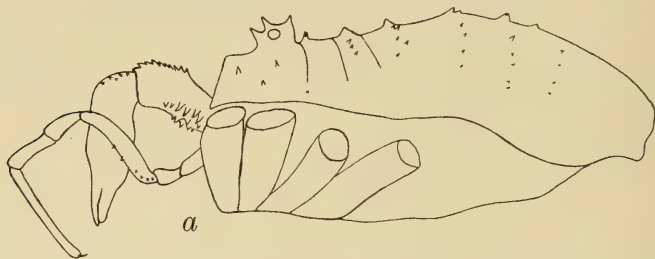
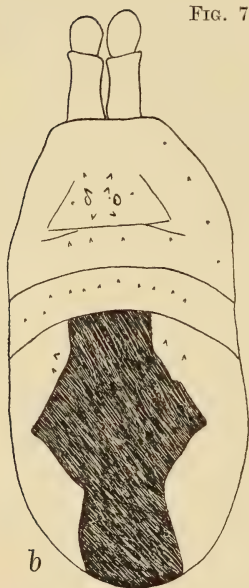


FIG. 76.—*Rhampsinitus silvaticus*. *a*, ♂ seen from the side; *b*, ♀ from above.



darker than the sides but lighter than the median marking; under surface as in ♂, dirty white, the coxae ringed with brown distally; femur of pedipalp with a black stripe in the middle on the outer side, tarsus infuscated black at its base; legs, except the second pair which are uniform light brown, not uniformly dark but banded; femora I, III, and IV with a fairly narrow blackish band near their distal apices, the apices themselves with a white band narrower than the blackish band; tibiae with a blackish band in the middle broader than that of the femora, patellae infuscated with brown stripes at the sides, metatarsi and tarsi more or less indistinctly banded with brown. Chelicerae normal, unspined; femur of pedipalp with a few

minute granules below; I and II thoracic tergites with a transverse row of small whitish spines, abdominal tergite I with a short lateral row of 2 spines on each side, remaining tergites with very small or no spines; legs unarmed except femora, which have rows of minute fine spicules; tarsal segments 46 : 59 : 46 : 54.

Measurements.—Length of body 6.7, chelicerae I+II, 3; leg I, 32 mm.

Types 2 ♂♂, 3 ♀♀, Knysna Forest. Other specimens: 1 ♀, Cold-

stream, Humansdorp. This species is distinguished from most other species by the marked difference in colour of ♂ and ♀; the chelicerae in the ♂ are not much larger than those of the ♀; the legs are remarkably smooth and very long and slender; the species is probably localised in the forested area of the Knysna district.

Rhampsinitus transvaalicus n. sp.

(Text-fig. 77.)

Closely resembling *R. leighi* (Pocock, Proc. Zool. Soc., 1902, pt. 2, p. 396), differing from it chiefly in the shorter chelicerae.

Colour as in *leighi*, a uniform dark blackish brown, coxae in proximal half sometimes a little lighter, legs uniform black; ocular tubercle



FIG. 77.—*Rhampsinitus transvaalicus*. ♂: body and palp seen from the side.

with 3 dorsal spines, armature of dorsum as in *leighi*; chelicerae differing from *leighi* in being shorter, the sum of the two segments a little greater than the body length (the males here, however, probably not full grown); under surface of segment I on the outer side with a fairly regular row of about 11 strong curved teeth, these considerably larger than any other teeth found on the chelicerae (fig. 77); anterior surface of segment II with a number of small teeth and spicules not reaching as far distally as in *leighi*; coxa I with a few small granules, remaining coxae smooth; pedipalp as in *leighi*, femur equal in length to patella+tibia, shorter than tarsus, unspined. Legs: femur I with 5 rows of tooth-like spines, the 2 ventral rows largest, patella similar, tibia with 2 ventral rows of minute setiform spines, femur below at inner apex with 3-4 enlarged teeth, patella below with 2 rows of fairly large teeth, the 2-3 apical ones on each side enlarged; femora of remaining legs with weaker spines than in I, remaining segments unspined.

Measurements.—Length of body 5, chelicerae I+II, 2.6+3.4, pedipalp 5.5; leg I, 28; II, 49 mm.

♀. *Colour*.—Sternites lighter than in ♂, white infuscated with brown and with transverse rows of blackish spots; coxae in proximal half a little lighter than in distal half; body larger than in ♂, chelicerae shorter, without teeth or granules, some black bristles near the apex of segment II; femora of legs with distinctly weaker spines than in ♂: tarsal segments 38:62:39:43.

Measurements.—Length of body 7.7, chelicerae I+II, 1.6+2.6, pedipalp 5.8 mm.

Types, 1 ♂, 1 ♀, 4 juvenile ♂♂, Zoutpansberg, near Louis Trichardt, Transvaal.

Rhampsinitus lalandei Simon.

(Text-fig. 78.)

1879. Simon, Ann. Soc. Ent. Belgique, xxii, p. 72.

1923. Roewer, Die Weberknechte der Erde, p. 785, fig. 958.

The following is Roewer's amended description of the type:—

Colour of body reddish brown; appendages blackish except fingers of chelicerae and terminal segment of legs I and II which are light red. Body convex above, obtusely truncate posteriorly; carapace with

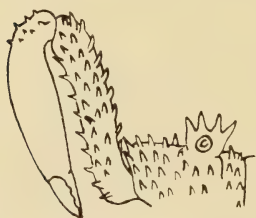


FIG. 78.—*Rhampsinitus lalandei* Simon. ♂: ocular tubercle and chelicera from the side (copied from Roewer).

ocular tubercle (4 spines on each side above) and chelicerae of ♂ as in fig. 78; thoracic tergites I and II and all abdominal tergites thickly, coarsely, and irregularly spined; all free sternites smooth; surfaces of coxae I–IV roughly granular; chelicerae of ♀ normal, segment I toothed above; pedipalp of ♂ slender and very long: femur–tibia cylindrical and slender; patella anteriorly in the middle without an apophysis; femur all over and patella above roughly and irregularly toothed;

tibia and tarsus unarmed, tarsus, however, with a row of small granules below; pedipalp of ♀ normal, femur and patella more or less toothed. Legs powerful; trochanters I–IV toothed on each side; femora I–IV more or less angular, the edges each with 1 row of sharp teeth: patellae I–IV slightly angular and with weaker teeth; tibia I–IV not angled but somewhat compressed laterally and with some very weak rows of teeth. Secondary sexual characters of ♂ present in chelicerae and pedipalp.

Measurements.—Length of body 6·5, pedipalp of ♂ 12, chelicera of ♂ 7+7·8, femora I–IV, 12 : 17 : 9 : 13 ; legs I–IV, 44 : 72 : 39 : 56.

Types, several examples (♂ and ♀) from “Cafrerie.” Type in Paris Museum. The South African Museum does not possess representatives of this species.

Rhampsinitus crassus Loman.

(Text-fig. 79.)

1898. Loman, Zool. Jahrb. Syst., ii, p. 520.

1903. *R. leppanae* Pocock, Proc. Zool. Soc. (1902), pt. 2, p. 392.

1923. Roewer, Die Weberknechte der Erde, p. 789, fig. 964.

The following is Roewer’s amended description of the type :—

Colour of body light brown above, sprinkled with blackish dots between the pale yellow black-tipped spines ; a well-defined dark brown median marking usually divided in the middle by a pale yellow longitudinal stripe ; abdomen above on each side of the median marking with scattered black, white-encircled dots ; abdomen below greyish white, coxae I–IV similar ; chelicera and pedipalp rich brown more or less mottled dark brown ; legs brown with darker stripes.

Body convex above, rounded posteriorly ; carapace in front of ocular tubercle with 3 rows of teeth, ocular tubercle above with 4 short teeth on each side, otherwise as in fig. 79 ; thoracic tergites I and II each with 1 transverse row of small teeth ; all free sternites smooth ; surfaces of coxae I–IV thickly and irregularly granular ; chelicera of ♀ small, normal segment I granular above, that of ♂ as in fig. 79, in addition, segment I below on the inner side with a complete row of teeth ; pedipalp of ♀ short, that of ♂ as in fig. 79 ; legs powerful, trochanters I–IV toothed on each side ; femora I–IV edged and at each edge a row of teeth ; tibiae and patellae I–IV angled but unarmed ; secondary sexual characters of ♂ present in chelicerae and pedipalp as well as in leg I, in which the femur is more or less thickened distally and (especially ventrally) strongly toothed ; tibia incrassate, it and the slender metatarsus sparsely toothed below.

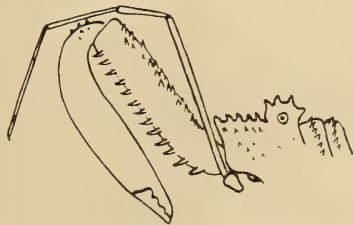


FIG. 79.—*Rhampsinitus crassus* Loman. ♂ : ocular tubercle, chelicera, and palp seen from the side (copied from Roewer).

Measurements of ♂.—Length of body 7, chelicerae I+II, 4·5+5·5,

pedipalp 14, femora I-IV, 4.5 : 7 : 4 : 4.5 ; legs I-IV, 23 : 45 : 19 : 27 mm.

♀. Length of body 8, chelicerae 4, pedipalp 7.5, femora I-IV, 4 : 7 : 4 : 5 ; legs I-IV, 20 : 35 : 19 : 28 mm.

Types from Port Elizabeth, in Lubeck Museum. Other localities : Johannesburg ; Teafountain, Grahamstown.

The South African Museum has about 38 specimens of both sexes from the following localities : Willomore, Montagu, Port Elizabeth, Addo Bush, Cogmanskloof (Ashton), Matjesfontein, Prince Albert, Dunbrody (Uitenhage Division), all middle Cape Province. The Albany Museum has specimens from Steytlerville and East London. Throughout this series only the first and second coxae at most are granular, generally only the first and then not very strongly so, the third and fourth are always smooth and not, as in the description quoted by Roewer, "*dicht und regellos bekornt*"; one male from Port Elizabeth has on the ocular tubercle 6 spines at the one side, 5 at the other, the specimens from Montagu, Matjesfontein, and Ashton have generally 3 spines on each side.

Rhampsinitus minor Loman.

(Text-fig. 80.)

1898. Loman, Zool. Jahrb. Syst., ii, p. 519.

1923. Roewer, Die Weberknechte der Erde, p. 790, fig. 965.

The following is Roewer's amended description of the type :—

Colour of body dark brown above, the dorsal spines almost black ; ventral surface of abdomen and coxae I-IV light brown ; appendages



FIG. 80.—*Rhampsinitus minor* Loman. ♂: ocular tubercle and chelicera from the side (copied from Roewer).

a uniform yellow brown. Body convex above, posteriorly rounded ; carapace and ocular tubercle (above with 3 spines on each side) as in fig. 80 ; thoracic tergites I and II and all abdominal tergites with each 1 transverse row of small spines ; all free sternites and surfaces of coxae I-IV smooth ; chelicera of ♀ small, normal, smooth, that of ♂ as in fig. 80 ; pedipalp of ♀ and ♂ small, normal, the femur only sparsely toothed below ; legs powerful, femora I-IV angular, the edges (especially in III and IV femora)

with 1 row of teeth ; tibia I-IV weakly angled and sparsely toothed ; secondary sexual characters of ♂ present in chelicera.

Measurements.—Length of body 6, chelicerae 2+2·5, pedipalp 5·5, femora I–IV, 4 : 8 : 4 : 4·5 ; legs I–IV, 20 : 53 : 18·5 : 28.

Types, ♂ and ♀ from Illovo, Verulam, Natal ; in Amsterdam Museum. The South African Museum has no representatives of this species.

Rhampsinitus telifrons Pocock.

(Text-fig. 81.)

1903. Pocock, Proc. Zool. Soc. (1902), pt. 2, p. 395.

1923. Roewer, Die Weberknechte der Erde, p. 790, fig. 966.

The following is Roewer's amended description of the cotype :—

Colour of body yellow brown ; carapace and abdomen on each side speckled with brown, an ill-defined dark brown median band lighter and more or less obliterated in the middle ; appendages light reddish yellow ; femora–tibia infuscated with brown.

Body convex above and bluntly truncate posteriorly ; carapace and ocular tubercle (the latter with 5 teeth on each side above) as in fig. 81, thoracic tergites I and II and all abdominal tergites with 1 transverse row of spines ; all free sternites and surfaces of coxae III and IV smooth, coxae I and II roughly granular ; chelicera as in fig. 81 ; pedipalp short, normal, trochanter and femur ventrally sparsely toothed ; legs powerful, trochanters I–IV toothed on each side, femora–tibiae I–IV angular and femora only with a row of teeth along the edges ; secondary sexual characters of ♂ present in chelicerae.

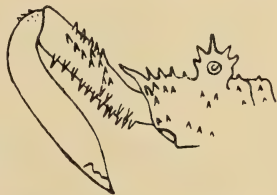


FIG. 81.—*Rhampsinitus telifrons* Pocock. ♂ : ocular tubercle and chelicera seen from the side (copied from Roewer).

Measurements.—Length of body 8, chelicera 3·5+4, pedipalp 6, femora I–IV, 4 : 7·5 : 4 : 6·6 ; legs I–IV, 21 : 38 : 19 : 27.

Type, 1 ♂ from Jansenville, Cape Province. Type in British Museum. The South African Museum possesses no representatives of this species.

Rhampsinitus leighi Pocock.

(Text-fig. 82.)

1903. Pocock, Proc. Zool. Soc. (1902), pt. 2, p. 396.

1923. Roewer, Die Weberknechte der Erde, p. 791, fig. 967.

The following is Roewer's amended description of the cotype :—

Colour of body above blackish brown, the free sternites lighter,

these in the ♀ yellowish white; coxae I-IV dark brown; appendages a uniform blackish brown.

Body convex above and bluntly truncate posteriorly; carapace and ocular tubercle (the latter above with 3 spines on each side) as in fig. 82;

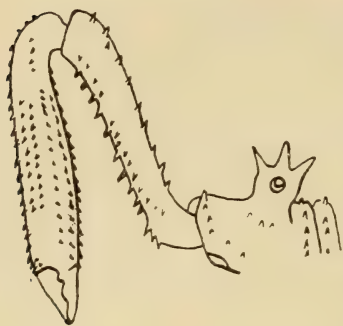


FIG. 82.—*Rhapsinitus leighi* Pocock. ♂: ocular tubercle and chelicera seen from the side (copied from Roewer).

thoracic tergites I and II and all abdominal tergites with 1 transverse row of spines; all free sternites and surfaces of coxae III and IV smooth, coxae I and II roughly granular; chelicerae of ♀ small, normal, segment I above more or less granular, that of ♂ as in fig. 82; pedipalp of ♂ and ♀ similar, normal, unarmed; legs powerful, femora-tibiae I-IV angular, femora I-IV only with a row of teeth along the edges; secondary sexual characters of ♂ present in chelicerae.

Measurements.—Length of body 6-8; chelicerae of ♂ 4-6+6-9, pedipalp 7, femora I-IV, 12:17:9:13; legs I-IV, 45:74:41:58.

Types, ♂ and ♀ from Durban, Natal. Types in British Museum. The South African Museum has this species from Stella Bush, Durban; Krantzklouf, Natal; Kentani; Umtata. The Natal Museum has it from Ifafa, Natal.

This species is easily distinguished by the almost uniformly dark coloration of the male and the strongly contrasting colours of the female, in which the ventral surface is a brilliant ivory white; the legs are very long and slender; the chelicerae in the males are longer than in any other South African species but vary considerably; in the South African Museum specimens they are 2-3 times the body length, in one specimen in the collection of the Natal Museum they are almost 4 times the body length.

Rhapsinitus spenceri Pocock.

(Text-fig. 83.)

1903. Pocock, Proc. Zool. Soc. (1902), pt. 2, p. 394.

1923. Roewer, Die Weberknechte der Erde, p. 791, fig. 968.

The following is Roewer's amended description of the cotype:—

Colour of body above greyish yellow with a lighter more or less dark infuscated median longitudinal band, a saddle-shaped marking behind

the ocular tubercle only weakly indicated ; ventral surface of abdomen and coxae I-IV ash grey more or less speckled with brown ; chelicera and pedipalp light yellow more or less speckled with brown ; legs yellow brown, metatarsi and tarsi I-IV darker ; all spines of the body and appendages light yellow minutely tipped with black. Body convex above, rounded posteriorly ; carapace : anterior margin with 1 tooth in the middle, ocular tubercle above with 4 teeth on each side, otherwise as in fig. 83 ; thoracic tergites I and II and abdominal tergites I-IV each with 1 transverse row of small spines ; remaining tergites, all free sternites, and surfaces of coxae III and IV smooth ; coxae I and II roughly granular ; chelicera of ♀ small, normal, that of ♂ as in fig. 83 ; pedipalp of ♀ short, normal, that of ♂ long, thin, and unarmed ; legs slender, trochanters I-IV on each side more or less toothed, femora-tibiae angled, femur at the edges with a powerful row of teeth, patella similarly but sparsely toothed ; secondary sexual characters of ♂ present in chelicera and pedipalp.

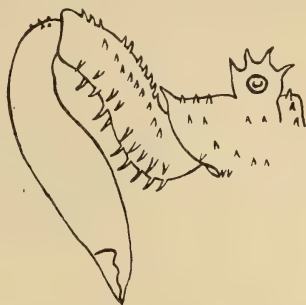


FIG. 83.—*Rhampsinitus spenceri* Pocock. ♂: ocular tubercle and chelicera from the side (copied from Roewer).

Measurements of ♂.—Length of body 6·5, chelicera 4·2+4·7, pedipalp 13 ; legs I-IV, 19 : 29 : 18 : 29.

Types, ♂ and ♀ from Natal (exact locality unknown). Types in British Museum. The South African Museum does not possess representatives of this species.

Rhampsinitus hispidus Roewer.

(Text-fig. 84.)

1911. Roewer, Arch. Naturg., lxxvii, Suppl. 2, p. 92.

1923. Roewer, Die Weberknechte der Erde, p. 792, fig. 969.

Colour of body above rich leather brown, a dark median band weakly defined in the anterior part of abdomen in the ♂, more distinct in the ♀, constricted on the first abdominal tergite where it is bordered by a light patch on each side, broadening again on the second tergite and from here to the operculum anale parallel sided ; abdomen below and coxae I-IV greyish white, speckled with light brown ; appendages uniformly reddish yellow.

Appearance and armature of body, ocular tubercle (the latter with 3 spines above on each side) as in fig. 84; surface of carapace anterior to the ocular tubercle smooth in the middle but anterior margin with 1 forwardly projecting spine in the middle; chelicera of ♀ small, normal, that of ♂ long and slender, fig. 84; legs powerful, trochanters I-IV

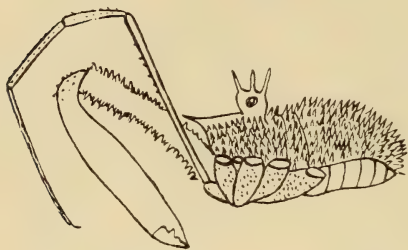


FIG. 84.—*Rhampsinitus hispidus* Roewer.
♂: ocular tubercle, palp, and chelicera from the side (copied from Roewer).

encircled with spines; femora I-IV angled and at the edges with 1 row of teeth; patellae I-IV with 3 dorsal rows of teeth, ventral surfaces smooth; tibia II practically smooth, tibiae III and IV each with 5 indistinct rows of minute teeth; secondary sexual characters of ♂ present in chelicera, pedipalp, and leg I; femur I more or less incrassate and bent a little forwards, tibia smooth above, below with sharp teeth.

Measurements of ♂.—Length of body 7, chelicera 6+8, pedipalp 19, femora I-IV, 7:12:7:8; legs I-IV, 28:43:28:33.

♀. Length of body 9, chelicera 4, pedipalp 10, femora I-IV, 7:13:7:10; legs I-IV, 30:57:30:43.

Types from Port Elizabeth, ♂ and ♀. Types in Hamburg Museum.

The South African Museum has specimens from Blue Cliff, Uitenhage; the Albany Museum, Grahamstown, has it from Alicedale, Port Alfred, Grahamstown.

Rhampsinitus echinodorsum Roewer.

(Text fig. 85.)

1912. Roewer, Abh. Ver. Hamburg, xx, fasc. 1, p. 163.

1923. Roewer, Die Weberknechte der Erde, p. 792, fig. 970.

Colour of body dark brown above; carapace on each side with lighter spots; ocular tubercle light yellow; abdomen anteriorly on each side somewhat lighter brown so that anteriorly traces of a dark brown median saddle-shaped marking appear; all free sternites greyish white sometimes narrowly bordered with dark brown; coxae I-IV dark brown, especially anteriorly; chelicera shining blackish brown; pedipalp dark brown except femur-tibia apically and whole of tarsus which are yellowish white; legs dark brown except the

yellowish-white black-tipped teeth; femora I-IV at their bases with lighter joints; tibiae in their basal halves as well as metatarsi and tarsi I-IV lighter.

Body above convex, posteriorly rounded; carapace and ocular tubercle (the latter with 3 spines on each side above) as in fig. 85; thoracic tergites I and II and all abdominal tergites very closely and thickly provided with strong irregularly placed spines; all free sternites smooth; surfaces of coxae I-IV roughly granular; chelicera and pedipalp of ♂ as in fig. 85; legs slender, trochanters I-IV strongly toothed on each side; femora-tibiae I-IV angles and the edges each with a row of teeth; secondary sexual characters of ♂ present in chelicera, pedipalp, and leg I; femur I somewhat stouter than the rest.

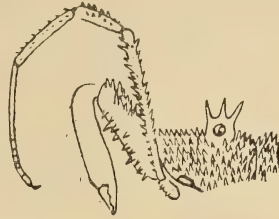


FIG. 85.—*Rhapsinitus echinodorsum* Roewer. ♂: ocular tubercle, palp, and chelicera from the side. (Copied from Roewer.)

Measurements.—Length of body, 5.5, chelicerae 2+2.5, pedipalp 7, femora I-IV, 5:9:5.5:7.5; legs I-IV, 21:33:21:30.

Type, 1 ♂ from Windhoek, South West Africa. Type in the collection of Dr. Roewer. This species is not represented in the collection of the South African Museum.

Rhapsinitus granarius Roewer.

(Text -fig. 86.)

1916. Roewer, Arch. Naturg., lxxxii, A, fasc. 2, p. 154, t. 44.

1923. Roewer, Die Weberknechte der Erde, p. 793, fig. 972.

Colour of body greyish to reddish yellow; carapace and abdomen on each side above speckled blackish; coxae I-IV minutely speckled with brown on each side; chelicera and pedipalp reddish yellow; legs reddish yellow except femora I-IV apically and patellae I-IV which are infuscated a little darker brown. Body convex above, closely and minutely granular, rounded posteriorly; carapace and ocular tubercle (the latter with 4 teeth on each side above) as in fig. 86; thoracic tergites I and II and all abdominal tergites each with 1 transverse row of small spines; all free sternites smooth; surfaces of coxae I-IV irregularly granular; chelicerae from the outer side as in fig. 86, in addition segment I on the inner side below with a longitudinal row of 5-7 teeth in its basal $\frac{2}{3}$; pedipalp as in fig. 86;

legs powerful, trochanters I-IV toothed on each side; femora-tibiae I-IV angled, femur and patella at the edges with a longitudinal row of teeth, tibia unspined; secondary sexual characters of ♂ present in the chelicerae, pedipalp, and leg I; femur I especially strongly toothed and curved forwards, somewhat incrassate apically (fig. 86).

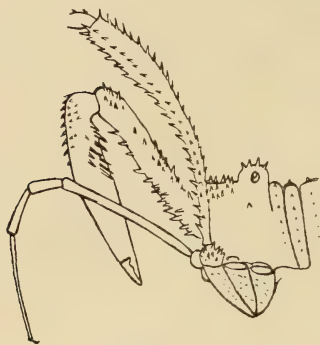


FIG. 86.—*Rhapsinitus granarius* Roewer. ♂: ocular tubercle, palp, chelicera, and femur seen from the side. (Copied from Roewer.)

Measurements.—Length of body 7, chelicera 3+4, pedipalp 7, femora I-IV, 5 : 6.5 : 4 : 5; legs I-IV, 19 : 31 : 19 : 23.

Type, 1 ♂ from Johannesburg, Transvaal. Type in the collection of Dr. Roewer. This species is not represented in the collection of the South African Museum.

APPENDIX.

Speleosiro argasiformis n. sp.

(Text-fig. 87, a-c.)

1931. Roewer, Zeitschr. fur wissenschaftl. Zoologie, Bd. 138, p. 158, fig. 6.

The following is a description of the ♂.

Colour.—Body deep reddish brown, appendages light brown.

Tergites with granulation as in ♀, sternites as in ♀. Inferior surfaces of coxae with sparse fairly long golden brown hairs, these more dense at the margins of coxa I than on the remaining coxae.

Pedipalps and chelicerae as in ♀. Leg IV as in fig. 87, a, b, with two tarsal segments, the proximal of which is armed with a hooked process; second tarsal joint twice as long as the first or process-bearing joint (fig. 87, b), thereby differing from *Purcellia illustrans* in which these joints are of equal length.

Arculi genitales distinct and prominently raised when seen from the side.

Corona analis as in fig.

87, c; anal operculum at each side with a row of 5-7 strong curved setae meeting in the middle line where two posteriorly converging keels are to be seen; seen from above and below abdomen slightly incised at its posterior apex in the middle line.

Measurements.—Length of body 4·7, breadth 3; 1 leg 7·5, chelicera; segment I, 2; segment II, 2·5 mm.

Two adult male specimens from the same locality as that in which the female types were found—Wynberg Caves, Table Mountain.

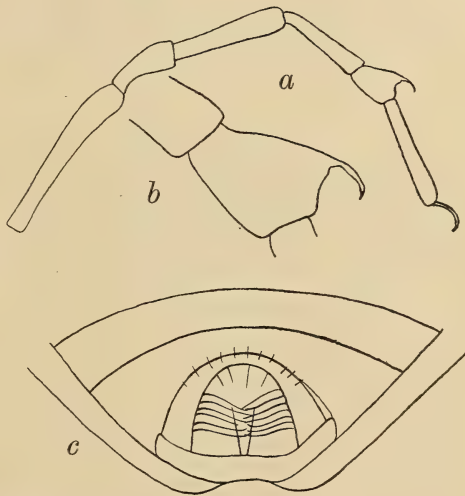


FIG. 87.—*Speleosiro argasiformis*. ♂: a, leg IV; b, first or process-bearing joint of tarsus enlarged; c, corona analis.

Ceratomontia cheliplus Roewer.

(Text-fig. 88.)

1931. Roewer, Zeitschr. für wissenschaftl. Zoologie, Bd. 138, p. 158, fig. 6.

The following is a translation of Roewer's description.

Dimensions.—Length of body 3; legs I–IV, 4·5:7·2:5:6·8 mm.

Ocular tubercle directed forwards, terminating in a blunt point, granular. Anterior margin of carapace demarcated by a transverse furrow and provided on each side of the ocular tubercle with 3 forwardly directed teeth. Surface of carapace, scute, and free tergites of abdomen uniformly covered with fine and close granulation; areas I–V of dorsal scute clearly defined, and as in free tergites I–III provided with a transverse row of tubercles. Free sternites of abdomen each with a transverse row of granules; surfaces of coxae I–IV smooth matt without marginal rows of tubercles, anterior margin

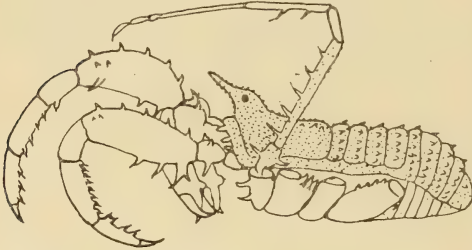


FIG. 88.—*Ceratomontia cheliplus* Roewer. ♂: seen from the side.

of coxa I with 2 teeth, coxa II at its posterior apex and coxa IV at its anterior apex provided with a group of tubercles. Chelicerae: segment I with a distinct dorsal enlargement which bears 1 tooth on its distal third, otherwise unarmed; segment II provided anteriorly with some scattered granules and posteriorly

above the immovable claw with a thickened tubercle. Palps: trochanter above with 2, below with 1 tooth; femur above with a longitudinal row of 5 teeth, apically on each side of it some small scattered teeth, on its inner side apically with 1 tooth, below with 3 basal teeth, the one situated nearest the base bifid; patella to tarsus smooth above, patella on inner side with 1 tooth, tibia on inner side below with 4, on outer side below with 8 blunt teeth; tarsus below on each side with 3 blunt teeth, the basal one on the outer side unusually stout and incompletely bifid. Legs unarmed, sparsely granular as far as the tibia, trochanter I, however, with 2 teeth, femur I below with a longitudinal row of 5–6 teeth, and tibia I below with 2 teeth; tarsal segments 2:3:3:3; terminal section of tarsus I consisting of 1, II of 2 segments.

Colour of body and appendages reddish yellow, carapace, scute, and free tergites of abdomen with blackish reticulation.

Grahamstown, South Africa, 12 (♀, ♂). Collected by the Rev. R. Godfrey. Types in British Museum, London.

Ceratomontia irregularis, I am certain, will have to be sunk in favour of *C. cheliplus*; in the former case the ♀ having been described, in the latter the ♂. Unfortunately I have not been able to compare the types.

Ceratontia wernerii Roewer.

(Text-fig. 89.)

1931. Roewer, Zeitschr. für wissenschaftl. Zoologie, Bd. 138, p. 159, fig. 7.

The following is a translation of Roewer's description.

Dimensions.—Length of body 3·5; legs I–IV, 5·5:8:5:7·5 mm.

Ocular tubercle directed forwards, terminating in a sharp point, granular. Anterior margin of carapace demarcated by a transverse furrow, and provided on each side of the ocular tubercle with 1 forwardly directed tooth. Surface of carapace, scute, and the free tergites of abdomen uniformly covered with fine and close granulation. Carapace behind the ocular tubercle with about 6 scattered tubercles, similar to those forming a transverse row on each of the clearly defined areas of the scute and the free tergites of the abdomen. Free sternites of the abdomen each with a transverse row of granules.

Surfaces of coxae I–IV sparsely and irregularly granular; anterior margin of coxa I with scattered coarse tubercles; coxa II at its posterior apex and coxa IV at its anterior apex provided with a group of tubercles, coxa IV in addition with a row of tubercles along its posterior margin which is absent in the other coxae.

Chelicerae: segment I with a clearly defined apical enlargement dorsally which is provided with 1 outer basal and 2 inner apical teeth; segment II smooth anteriorly. Palps: trochanter above with 3 and below with 1 tooth; femur above with a longitudinal row of 10–11 teeth, apically on each side of it 2–3 teeth, apically on inner side with 2 teeth, and below with a complete longitudinal row of 7 blunt, forwardly bent teeth of equal size; patella to tarsus smooth above; patella apically on inner side with 1 blunt tooth; tibia below on inner side with 5, on the outer side with 7 blunt teeth; tarsus below on the inner side with 4, on the outer side with 5 blunt teeth. Legs (including leg I) unarmed, sparsely granular as far as the tibia; tarsal segments 2·3:3·3; terminal section of tarsus I consisting of 1, tarsus II of 2 segments.

Colour of body and appendages uniformly reddish yellow, nowhere reticulated with black.

Windhuk, South West Africa, 1 ♂. Collected by Werner, 1925. Type in the collection of Dr. Roewer, No. 1296/38.



FIG. 89.—*Ceratontia wernerii* Roewer. ♂: seen from the side.

Adaeum hewitti Roewer.

(Text-fig. 90.)

1931. Roewer, Zeitschr. für wissenschaftl. Zoologie, Bd. 138, p. 175, fig. 25.

The following is a translation of Roewer's description.

Dimensions.—Length of body 4; legs I-IV, 4·5:7·5:5:7 mm.

Ocular tubercle rounded closely and irregularly covered with papillae; anterior margin of carapace closely beset with long papillae of which the middle is the largest. Surface of carapace and scute together with the free tergites closely and irregularly covered with papillae, of which a median pair of blunt conical tubercles is outstanding on areas I-IV, a transverse row of 9-11 similar tubercles on the posterior margin of scute (=area IV) and free tergites of abdomen. Free sternites of abdomen irregularly granular, surfaces of coxae



FIG. 90.—*Adaeum hewitti* Roewer. ♂: seen from the side.

I-IV thickly covered with papillae, which on the anterior margin of coxa I, at the posterior apex of coxa II, and the anterior apex of coxa IV are stouter than in the remaining surfaces of the coxae. Chelicerae with both segments granular, segment I in addition armed dorsally with 1 tooth. Palps thickly covered with papillae, of which

only the inner side of the femur and the lower sides of patella, tibia, and tarsus remain free; trochanter below with 1 tooth, femur below with 2 (1 basal, 1 middle), apically on the inner side with 1, above with a longitudinal row of 5 teeth; patella below on the inner side with 2 teeth; tibia and tarsus on each side below with 3 teeth. Legs as far as tibiae thickly covered with papillae, trochanters in addition posteriorly and anteriorly with 1-2 teeth, femur with a longitudinal row of teeth both below and above. Tarsal segments 3: 7-8: 4: 4 (juvenile 2: 2: 3: 3); terminal section of tarsus I consisting of 2, tarsus II of 3 segments.

Colour of body and appendages a dirty dark brown.

Grahamstown, South Africa, 1 ♂, 1 juvenile. Collected by the Rev. R. Godfrey. Types in the British Museum, London.

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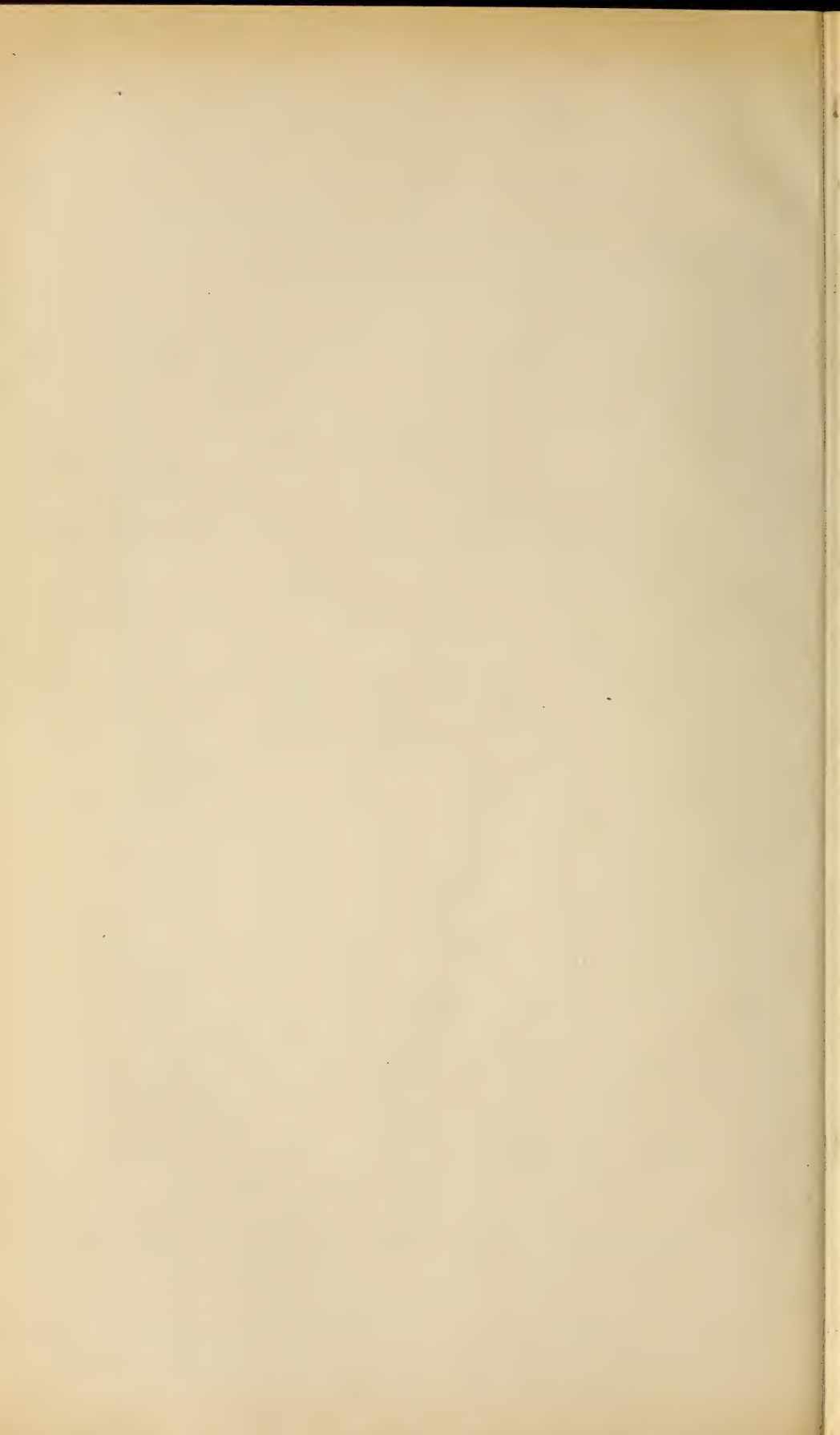
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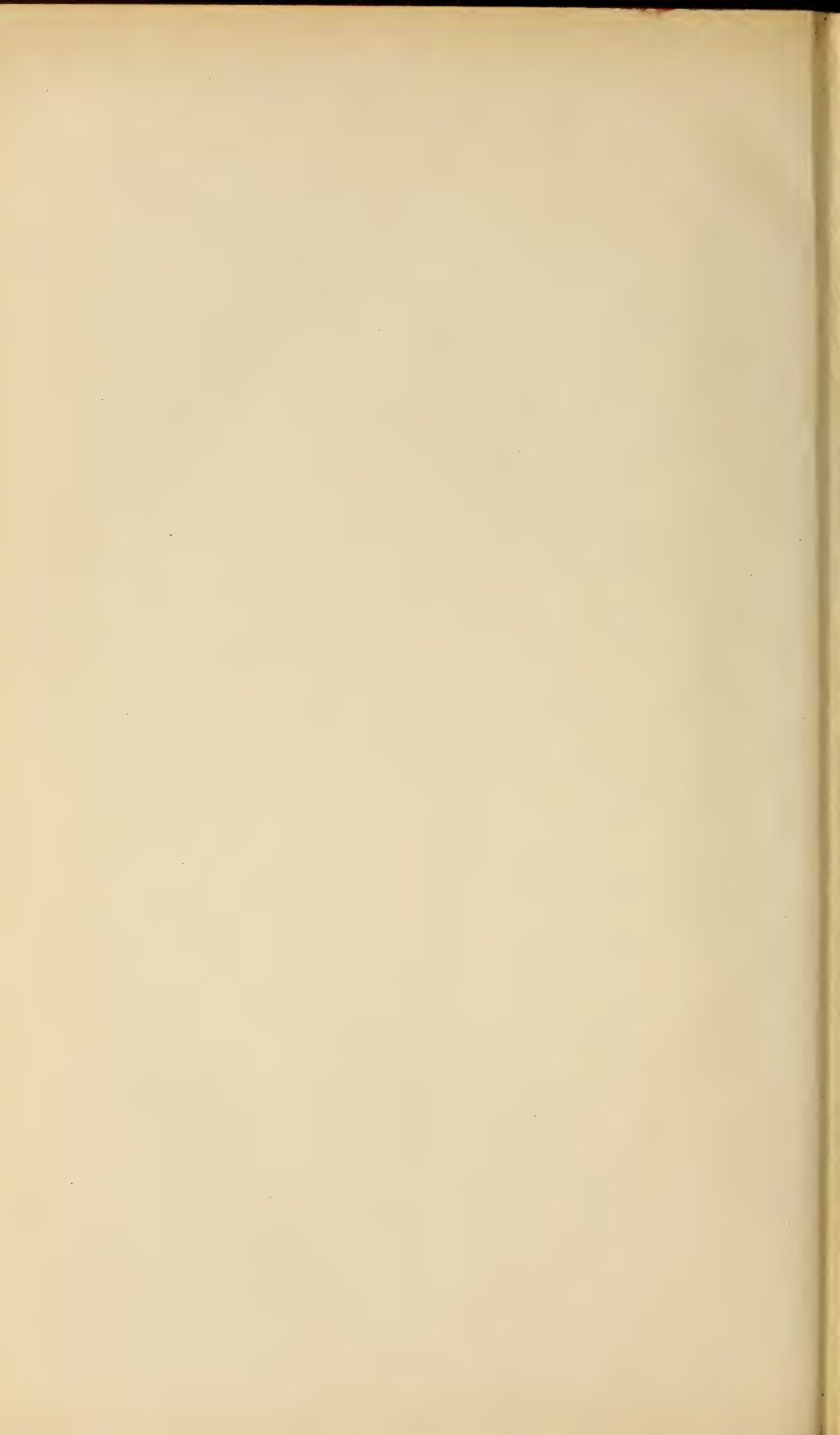
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